LAUNCH COMPLEX 39A, SWMU 008
INTERIM MEASURES AT THE HIGH-CONCENTRATION AND LOW-CONCENTRATION PLUMES
CONSTRUCTION COMPLETION REPORT
KENNEDY SPACE CENTER, FLORIDA

Prepared for:



National Aeronautics and Space Administration
Kennedy Space Center, Florida

July 2015
Revision 0

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FOR
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July 2015

PROFESSIONAL ENGINEER CERTIFICATION

This Construction Completion Report for Interim Measures at the High-Concentration and Low-Concentration Plumes at Launch Complex 39A, SWMU 008, Kennedy Space Center, Florida, dated June 2015, has been prepared by or under the responsible supervision, direction, or control of the Florida-licensed professional engineer whose signature and seal appear below.

July 2, 2015
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Florida P.E. License No. 50304
Engineering Business License Number 2429

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ABBREVIATIONS AND ACRONYMS

AS	air sparging
bls	below land surface
CCR	Construction Completion Report
cDCE	cis-1,2-dichloroethene
cfm	cubic foot per minute
COC	chemical of concern
DBA	Deluge Basin Area
DPT	direct-push technology
DTP	Domestic Treatment Plant
ECS	Environmental Control System
EE	Engineering Evaluation
EPA	United States Environmental Protection Agency
°F	degree Fahrenheit
FDEP	Florida Department of Environmental Protection
FTP	file transfer protocol
GCTL	Groundwater Cleanup Target Level
GFCI	ground fault circuit interrupter
HCP	high-concentration plume
HDPE	high-density polyethylene
HFF	Hypergol Fuel Facility
HMI	human/machine interface
HOA	Hand-Off-Automatic
HOF	Hypergol Oxidizer Facility
HP	horsepower
HVAC	Heating, Ventilation, and Air Conditioning
I.D.	inside diameter
IDIQ	Indefinite Delivery Indefinite Quantity
IGWMP	interim groundwater monitoring plan

IM	interim measures
IMWP	Interim Measures Work Plan
ISCTL	industrial Soil Cleanup Target Level
IWP	Implementation Work Plan
KSC	Kennedy Space Center
KSCRT	Kennedy Space Center Remediation Team
LC39A	Launch Complex 39A
LCP	low-concentration plume
LH	liquid hydrogen
LOX	liquid oxygen
MCP	master control panel
MNA	monitored natural attenuation
msl	mean sea level
NADC	Natural Attenuation Default Concentration
NASA	National Aeronautics and Space Administration
NPT	National Pipe Thread
O&M	operations and maintenance
OEL	occupational exposure limit
OM&M	operations, maintenance, and monitoring
P&ID	piping and instrumentation diagram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PLC	programmable logic controller
ppmv	parts per million by volume
PRE	Preliminary Risk Evaluation
psig	pound per square inch gauge
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RFI	Resource Conservation and Recovery Act Facility Investigation
ROI	radius of influence

SAP	Sampling and Analysis Plan
scfm	standard cubic foot per minute
SOP	Standard Operating Procedure
STP	Sewage Treatment Plant
STS	Space Transportation System
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCE	trichloroethene
tDCE	trans-1,2-dichloroethene
TWA	time-weighted average
µg/L	microgram per liter
VC	vinyl chloride
VFD	variable frequency drive
VOC	volatile organic compound

EXECUTIVE SUMMARY

This document summarizes the activities associated with implementation of interim measures (IM) at the high-concentration plume (HCP) and low-concentration plume (LCP) portions of the Northwest and North Plumes within Launch Complex 39A (LC39A) located at Kennedy Space Center (KSC), Florida. The LC39A site has been designated Solid Waste Management Unit Number (SWMU) 008 under KSC's Resource Conservation and Recovery Act (RCRA) Corrective Action Program.

The primary contaminants in the Northwest Plume are trichloroethene (TCE), cis-1,2-dichloroethene (cDCE), and vinyl chloride (VC), and the primary contaminant in the North Plume is VC. The HCP areas are defined by locations with groundwater concentrations exceeding the Natural Attenuation Default Concentrations (NADCs) for TCE (300 µg/L), cDCE (700 µg/L), and/or VC (100 µg/L), and the LCP areas are defined by locations with groundwater concentrations exceeding the Groundwater Cleanup Target Levels (GCTLs) for TCE (3 µg/L), cDCE (70 µg/L), and/or VC (1 µg/L).

The IM objective for the LC39A HCP and LCP IM is to actively decrease concentrations of TCE, cDCE, and VC in groundwater to levels less than GCTLs. The objective was developed because LC39A is currently being leased to SpaceX, and the long period of time for a monitored natural attenuation remedy was not suitable for this site use.

The IM for the HCP and LCP areas at LC39A includes the installation, operation, and monitoring of an air sparging (AS) system to treat dissolved-phase volatile organic compounds (VOCs) in groundwater in the treatment areas. The overall AS well array includes 122 AS wells in six treatment zones determined based on the lateral and vertical extents of the VOC plumes. The AS system includes a 50-horsepower rotary screw air compressor, integrated refrigerated air dryer, coalescing and particulate filters with an oil-water separator, 120-gallon receiver tank, manifold, and telemetry. Electrical service is provided through a 150-amp electrical service feeder from an existing 480-volt/150-amp breaker from a panelboard in Building J8-1553.

Two additional monitoring wells were installed to supplement the 16 existing monitoring wells included in the AS IM performance monitoring program. Baseline groundwater sampling was conducted in December 2014, and baseline air sampling was conducted in January 2015. System startup testing was conducted from January 19 through 26, 2015, and prove-out testing was conducted from January 27 through February 17, 2015. Full-scale AS operations began on February 18, 2015. The design flow rate for each AS well is 5 cubic feet per minute (cfm). In April 2015, flow rates for wells in Zones B, C, E, and F were approximately 5 cfm, with flow rates ranging from 4.9 to 6.4 cfm and averaging 5.4 cfm (i.e., within the range of the design point). Flow rates for wells in Zone D were between 6.0 and 6.4 cfm, which is greater than the design flow. Initially, wells in Zone A were operating between 2.9 and 3.2, which is less than the design flow. Wells and former boreholes in Zone A were subsequently re-grouted, and design flows were then met. Physical observations at the site suggest that the radii of influence (ROIs) is currently greater than the design estimate of 20 feet.

Based on the data collected to date, the AS system is operating as designed, and continued optimization is recommended to enhance and maintain operational objectives. Monthly operations and maintenance (O&M) of the AS system is ongoing, and the first quarterly performance monitoring event was conducted in May 2015, 3 months after the beginning of full-scale AS operations. After the first year of full-scale operation, groundwater monitoring results and operational data collected during monthly O&M site visits will be summarized and evaluated in an Operations, Maintenance, and Monitoring Report, and recommendations for future IM activities based on these results will be provided.

SECTION I

INTRODUCTION

This document summarizes activities associated with implementation of interim measures (IM) for an air sparging (AS) system at the High-Concentration Plume (HCP) and Low-Concentration Plume (LCP) portions of the Northwest and North Plumes within Launch Complex 39A (LC39A) located at Kennedy Space Center (KSC), Florida (see Figure 1-1). This Construction Completion Report (CCR) was prepared by Tetra Tech, Inc., for the National Aeronautics and Space Administration (NASA) under Indefinite Delivery Indefinite Quantity (IDIQ) Contract NNK12CA15B/NNK14CA23T, Task Order 9. The LC39A site has been designated Solid Waste Management Unit (SWMU) 008 under KSC's Resource Conservation and Recovery Act (RCRA) Corrective Action Program.

1.1 BACKGROUND SITE SETTING AND HISTORY

LC39A is located at KSC, Florida, and includes approximately 170 acres, as shown on Figure 1-2. LC39A consists of former launch pad 39A, which supported Apollo Space Program and Space Transportation System (STS) operations from the mid-1960s until 2011. The complex is currently being leased by SpaceX, and there are plans to modify the site for future launch missions. Activities at the following nine major operations support areas at LC39A under the STS Program may have resulted in impacts to environmental media:

- Compressed Air Building Area;
- Environmental Control System (ECS) Area;
- Heating, Ventilation, and Air Conditioning (HVAC) Building;
- Hypergol Fuel Facility (HFF);
- Hypergol Oxidizer Facility (HOF);
- Deluge Basin Area (DBA) (two holding tanks);
- Sewage Treatment Plant (STP) Facility;
- Domestic Treatment Plant (DTP) #1 associated with liquid oxygen (LOX) operation support building A-1 and LOX storage; and

- DTP-2 associated with liquid hydrogen (LH) operation support building A-2.

A Preliminary Assessment (EG&G, 1994) in 1994 focused on five areas of LC39A, including the Compressed Air Building, ECS Area, HVAC Building, HFF, and HOF. Samples were collected from surface and shallow subsurface soil, groundwater, and surface water in drainage swales. Soil samples from the ECS Area and HVAC Building had metals and polycyclic aromatic hydrocarbon (PAH) contamination, and metals were detected in groundwater at concentrations less than Florida Department of Environmental Protection (FDEP) G-II standards and in surface water samples at concentrations greater than KSC screening levels.

A RCRA Facility Investigation (RFI) (NASA, 2000) was completed from 1998 to 2000 to characterize the nature and extent of contamination at LC39A. Soil, groundwater, sediment (drainage swale soil), and drainage swale surface water samples were analyzed for a full suite of analytical parameters including volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), pesticides, cyanide, and other miscellaneous parameters. Primary chemicals of concern (COCs) identified during this investigation were as follows:

- Groundwater – VOCs, specifically chlorinated solvents, PAHs, phenols, and metals;
- Surface water – PAHs, metals, and pesticides;
- Soil – PCBs and PAHs; and
- Sediment (drainage swale soils) – PAHs, PCBs, metals, and pesticides.

A Preliminary Risk Evaluation (PRE) (NASA, 2000) indicated that unacceptable human health risks would result if groundwater was used as a source of drinking water, and unacceptable human health risks were also identified for exposure to soil under a residential land use scenario. The PRE also indicated that unacceptable human health risk would result from exposure to drainage swale soil under residential and industrial scenarios. An ecological risk assessment did not identify any ecological COCs for on-site soil, sediment, or surface water.

The RFI recommended an IM to remove soil and sediment at the DBA, ECS Area, and HVAC Building with concentrations greater than FDEP industrial Soil Cleanup Target Levels (ISCTLs), and the soil and sediment removal IM was completed in 2000. Implementation of groundwater monitoring in the DBA and HOF areas and additional sampling of off-site surface water and drainage swale soil were recommended to evaluate degradation and potential of groundwater impacts.

An RFI Addendum (NASA, 2003) was completed in 2003 to address regulatory comments received on the RFI Report including a request that additional groundwater investigations be conducted for the LOX tank storage area, DBA, and HOF.

Based on the results of the RFI Addendum (NASA, 2003), metals, PAHs, and phenols were eliminated as COCs in groundwater at LC39A. A chlorinated solvent plume was identified in groundwater downgradient of the LOX area outside the fence line, but the source of the plume was unknown and undocumented.

Upon completion of the STS Program in 2011, a Re-Assessment Investigation (NASA, 2012) was completed in 2012 to provide a baseline delineation of contamination in groundwater, soil, and drainage swale soil within the fence line of LC39A. Field activities included advancement of four soil lithology borings, collection and analysis of 3,400 groundwater samples via direct-push technology (DPT) from 655 locations to maximum depths of 60 feet below land surface (bls), installation and sampling of 21 monitoring wells, and collection and analysis of 786 soil and drainage swale soil samples from 761 locations.

The Re-Assessment Investigation identified two groundwater plumes, designated the Northwest and North Plumes, within the fence line of LC39A. The primary contaminants in the Northwest Plume are trichloroethene (TCE), cis-1,2-dichloroethene (cDCE), and vinyl chloride (VC). The primary contaminant in the North Plume is VC. The total area of the LCP at the site, defined by groundwater concentrations less than FDEP Natural Attenuation Default Concentrations (NADCs) but greater than Groundwater Cleanup Target Levels (GCTLs), is 7.6 acres, and the

total area of the HCP at the site, defined by groundwater concentrations exceeding NADCs, is 0.72 acre. The maximum depth of the LCP is 40 feet bls, and the maximum depth of the HCP is 30 feet bls.

The Re-Assessment Report recommended that an interim groundwater monitoring plan (IGWMP) be developed for LC39A to monitor the Northwest and North Plumes. Following completion of 2012 Re-Assessment activities, LC39A was transitioned into the KSC Engineering Evaluation (EE) process. The Step 1 EE, presented to the KSC Remediation Team (KSCRT) in May 2013, included delineation of groundwater inside the fence line of LC39A to FDEP GCTLs. The Step 2 EE presented at the November 2013 KSCRT meeting included a summary of previous investigations, COCs and medium of concern, cleanup criteria, and development and screening of IM alternatives. The recommended alternative in the Step 2 EE was monitored natural attenuation (MNA) in the HCP and LCP. The complex was not being used at the time of the decision, but the recommendation included a provision that if site use changed and unrestricted use of site groundwater was desired, the most aggressive option, AS in the HCP and LCP would be implemented. Since that time, SpaceX has entered into a lease for use of the complex, so AS in the HCP and LCP was selected for Step 3 EE/IM Work Plan (IMWP) development.

The Step 3 EE and IMWP for HCP and LCP portions of the Northwest and North Plumes at LC39A were presented at the December 2013 KSCRT and provided details of the proposed IM, which was a modified version of AS in the HCP and LCP. Instead of 40-foot well spacing, 50-foot well spacing was used in the LCP where VC concentrations were greater than 10 µg/L, and 60-foot spacing was used in the LCP where VC concentrations were less than 10 µg/L. The final IMWP, including the Step 3 EE and supplemental information, was submitted for regulatory approval at the December 2013 KSCRT meeting, and FDEP approved the IMWP at the December 2013 meeting (Meeting Minute 1312-M09, Decision 1312-D15). The IM described in the Step 3 EE was implemented in 2015.

Subsurface lithology at LC39A, characterized in descending order, consists primarily of sand to approximately 28 feet below mean sea level (msl). A 1-foot-thick layer of finer-grained silty clay is present within this sand unit at a depth of approximately 10 feet below msl. An interbedded sand and shell unit is present from approximately 28 to 40 feet below msl, and below the sand/shell unit is a layer of sand (to 49 feet below msl) underlain by a thin layer of clay overlying a silty clayey sand to a depth of 54 feet below msl. Below the silty clayey sand layer is a clay layer from 54 to 62 feet below msl that acts as a retarding unit. Groundwater flow in the northwestern and northern portions of the site is generally towards the north and northwest.

1.2 PURPOSE

The purpose of this report is to summarize IM construction and initial IM implementation activities conducted in accordance with the High-Concentration and Low-Concentration Plumes Implementation Work Plan (IWP) (NASA, 2014b). The IWP was prepared based on the IMWP for HCP and LCP.

1.3 INTERIM MEASURES OBJECTIVE AND SCOPE

The objective of the LC39A HCP and LCP IM is to actively decrease concentrations of TCE, cDCE, and VC in groundwater in the HCP and LCP via AS to levels less than GCTLs. The objective was developed because LC39A is currently being leased to SpaceX, and the original IM for MNA over an extended period of time was not suitable for this site use. Based on the treatment performance of the AS IM, AS operations may be modified, as appropriate, to achieve the IM objective.

The IM for HCP and LCP portions of the Northwest and North Plumes at LC39A includes the installation, operation, and monitoring of an AS system to treat dissolved-phase VOCs in groundwater in the treatment areas. The overall AS well array includes a total of 122 AS wells in six treatment zones placed based on VOC plume lateral and vertical extent. Concurrent with the drilling of the AS wells, two additional monitoring wells were installed to supplement the 16

existing monitoring wells included in the AS IM performance monitoring program. IM activities discussed in this CCR include AS and monitoring well installation; AS system installation; baseline groundwater sampling; AS system commissioning, startup, and startup monitoring; prove-out operations and maintenance (O&M), and the first month of full-scale O&M. Subsequent operations, maintenance, and monitoring (OM&M) of the AS system will be reported in annual OM&M Reports and presented to the KSCRT in Step 4 EEs.

1.4 REPORT ORGANIZATION

Section I: Introduction – Provides a brief overview of the report and discusses the purpose and objective of the IM.

Section II: Construction – Presents information regarding construction of the AS IM and summarizes AS and monitoring well installation activities. The purpose of this section is to provide information certifying that the system was constructed in accordance with the IMWP (NASA, 2013) and subsequent IWP (NASA, 2014b).

Section III: Baseline Sampling – Summarizes the results of baseline groundwater and air sampling conducted prior to operation of the AS IM to verify the levels of contamination identified in the IWP and to provide a baseline for comparison during system operation.

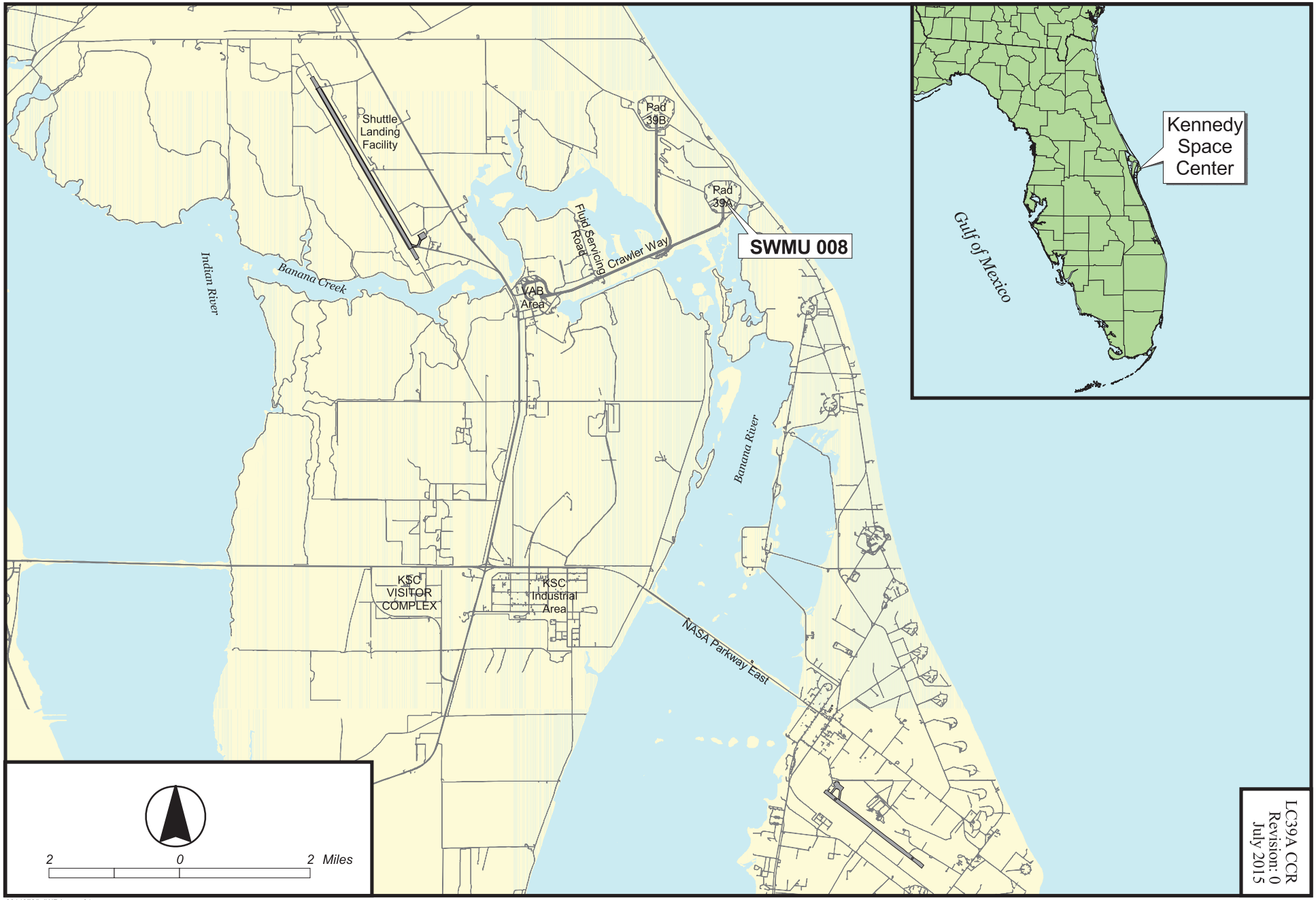
Section IV: AS System Commissioning and Startup – Provides the information collected during commissioning and startup of the AS system. Weekly O&M of the system is also discussed.

Section V: Conclusions and Recommendations – Provides a summary of the activities conducted in support of the IM and presents recommendations based on the results observed during IM startup.

Section VI: References – Provides a listing of the references cited in this report.

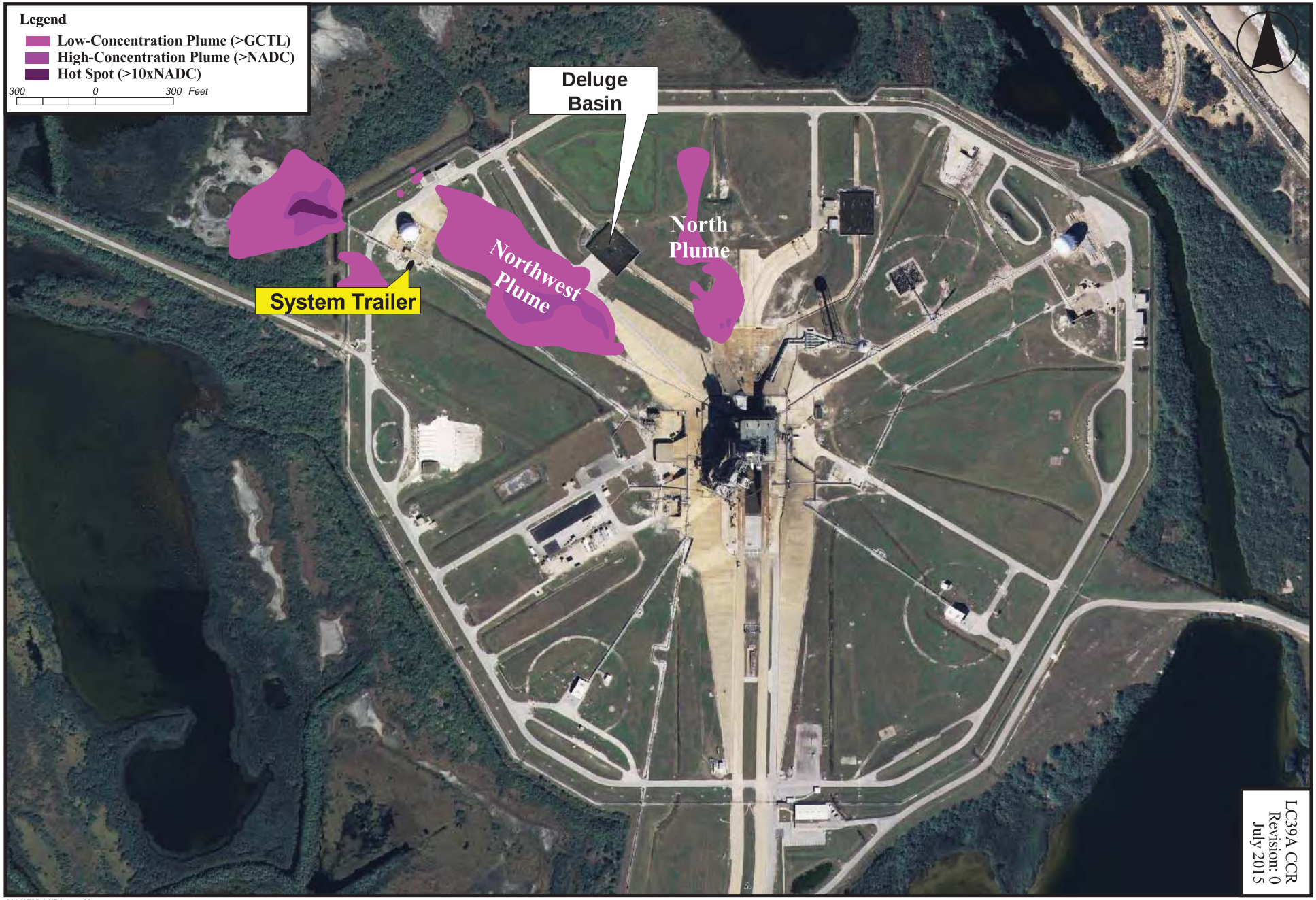
FIGURE 1-1 LOCATION OF KENNEDY SPACE CENTER AND SWMU 008

SWMU 008, KENNEDY SPACE CENTER, FLORIDA



20140725_IWP Layout01

FIGURE 1-2 SITE PLAN
SWMU 008, KENNEDY SPACE CENTER, FLORIDA



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20140725_IWP Layout02

SECTION II

CONSTRUCTION

Construction of the AS system was performed in accordance with the approved IMWP and IWP. Construction activities associated with implementation of the IM for the HCP and LCP portions of the Northwest and North Plumes at LC39A consisted of pre-construction preparation, mobilization, installation of AS and monitoring wells, trenching, installation of compressed air conveyance piping, assembly and installation of manifold cabinets, electrical utility installation, AS system setup and installation, and site restoration. A photographic log (digital imaging documentation) of site activities is presented in Appendix A, and a summary of day-to-day activities associated with construction of the AS system is presented in Appendix B.

2.1 MOBILIZATION

Prior to the beginning of drilling and system construction activities, a project work trailer was brought on site and secured next to the Deluge Basin for project support. The project support area consisted of a material lay-down area and covered canopy for shade relief on the side of the site trailer. Water used for decontamination of drilling equipment was supplied by an on-site water source. As detailed in the IWP, the drilling and system construction work was completed in compliance with the KSC Environmental Checklist, including the KSC Record of Environmental Consideration, Utility Locate/Excavation Permit, and monitoring well permits, which are provided in Appendix C. A threatened and endangered species survey was also conducted per the IWP on July 31, 2014. Tetra Tech mobilized construction equipment and materials to the site on August 1, 2014, to initiate infrastructure installation activities.

2.2 AIR SPARGING AND MONITORING WELL INSTALLATION

Prior to utility clearance by KSC, a stake-out survey was conducted during the week of July 28, 2014, to demarcate areas of proposed installation activities. The stake-out survey marked the locations of AS and monitoring wells to be installed as part of system construction. The area was grass covered, and no site clearing was required.

A total of 122 AS wells were installed as part of six AS zones, and two monitoring wells were installed to aid in remedial performance monitoring (MW0031I and MW0032I). AS wells were installed with 1-inch inside diameter (I.D.) Schedule 40 polyvinyl chloride (PVC) casings with 50-micron diffusers using sonic drilling technology. Monitoring wells MW0031I and MW0032I were installed with 1-inch I.D. Schedule 40 PVC casings and Schedule 40 PVC 0.010-inch slotted screens using sonic drilling technology. Figure 2-1 shows the locations of the AS wells, and Figure 2-2 shows the new and existing monitoring wells included in the AS performance monitoring program.

Drilling activities began on August 11, 2014, and were completed on August 28, 2014. A field geologist was present during AS and monitoring well installation activities and was responsible for direction of the drilling subcontractor, monitoring of drilling operations, geologic logging, and recording well installation and decontamination procedures. Well completion logs are included in Appendix D. Table 2-1 and Figure 2-3 provide AS well construction details, and Table 2-2 and Figure 2-4 provide new monitoring well construction details. As noted in Table 2-1, several AS were installed at an angle due to interferences such as foundations.

2.3 AIR SPARGING PIPING INSTALLATION

Compressed air is conveyed via six 2-inch I.D. high-density polyethylene (HDPE) headers from the AS system to the associated distribution manifolds located in each AS zone, and the manifolds then distribute air to the individual AS wells via 1-inch I.D. HDPE laterals. Approximately 34,000 feet of piping was installed below ground in trenches extending from the AS wells to the manifolds and then from the manifolds to the main line connecting to the system trailer. Portions of the laterals for four wells in Zone E were installed above ground using Schedule 40 galvanized steel. The piping was placed over the concrete deluge basin channel and is supported by the concrete channel walls. Piping network construction and installation details are described in the remainder of this section.

2.3.1 TRENCHING NETWORK. In accordance with the IWP, a network of trenches with minimum dimensions of 2 feet wide by 2 feet deep was excavated for installation of compressed air conveyance piping between AS wells and from the Building JB-1553 panel board to the AS system trailer for electrical service. Trenching in conjunction with pipe burial was conducted from August 20, 2014, to November 19, 2014, using a hydraulic excavator or by hand digging in locations where underground utilities were identified during utility clearance. After trenching was completed for each of the six AS zones, AS piping installation began for that zone (see Section 2.3.2), and then trenching began for the next zone until the piping for all zones had been installed. Where trench sections crossed asphalt or concrete to reach AS wells in Zones E and F, the pavement sections were saw-cut to form a smooth joint to facilitate resurfacing upon completion of the trenching operations. The cut material was loaded into roll-off boxes and transported to the KSC landfill for disposal.

2.3.2 AIR SPARGING PIPING INSTALLATION. Installation of AS piping was conducted from August 26 to November 19, 2014. After the trench for each AS zone was excavated, 1-inch I.D. HDPE lines were installed from the AS wells to the location of the distribution manifold for the corresponding zone. Each trench was then partially backfilled, marking wire and detectable caution tape were placed over the pipe to aid in future utility detection, and backfilling was continued to the ground surface. Approximately 2 to 3 feet of additional piping was left at both ends of the HDPE lines so that adequate material was available for proper connections to the well and manifold locations.

AS zones were then regraded to meet original topography, each well head was hand excavated with a shovel, and a transition tee was used to connect the HDPE line to the PVC well. After the connections were complete, the well heads were buried, and the surface was graded. Three plastic survey stakes were driven flush near each well to aid in locating the wells in the future.

As discussed above, portions of the pipelines to four wells in Zone E were constructed using galvanized steel instead of HDPE because this portion of the system is above ground. The existing channel walls were used to support galvanized steel piping.

2.4 DISTRIBUTION MANIFOLD INSTALLATION

Prior to placement of the distribution manifolds, individual concrete pads were constructed to create stable platforms for the manifolds for Zones A through D, and a large common pad was constructed for the manifolds for Zones E and F. The smaller pads were approximately 8 feet by 7 feet by 4 inches thick, and the larger pad for Zones E and F manifolds, which were set side by side, was approximately 8 feet by 14 feet by 4 inches thick. Anchor bolts were used to secure the manifolds to the bases of the footers.

The manifold cabinets were fabricated and installed from December 15 through 19, 2014. Each manifold has one 2-inch I.D. hole on the side of the enclosure. Nine to eleven 5/8-inch holes were drilled through the back of each cabinet for the discharge tubing from each air flow regulator assembly. From each manifold outlet, a flow meter [0 to 14 standard cubic feet per minute (scfm) scale range], flow-regulating needle valve, and pressure gauge [0 to 60 pounds per square inch gauge (psig) scale range] was installed on each line. The 0.5-inch flexible polyurethane tubing from each assembly exit the back of the manifolds and transition to 1-inch male-threaded fittings for connection to the lateral compressed air conveyance pipes to the AS wells (see Figure 2-5).

2.5 ELECTRICAL UTILITY INSTALLATION

In conjunction with SpaceX, Tetra Tech designed and installed the underground 150-amp electrical service feeder from an existing 480-volt/150-amp breaker from a panel board in Building J8-1553 to the panel board at the AS equipment trailer. An electrical power usage meter was also installed. Grounding of the electrical service components and AS system was conducted per the electrical service installation scope of work.

2.6 SYSTEM TRAILER SETUP AND INSTALLATION

The AS system trailer was delivered to the site on January 19, 2015, and the AS system was connected to the existing piping stick ups (the six 2-inch HDPE lines from the AS zones) on January 20, 2015. The AS equipment was pre-fabricated by a remediation equipment integrator

within the AS system trailer prior to delivery on site. The location of the AS system trailer is shown on Figure 2-1. The construction and design of the equipment used for the LC39A AS IM is summarized in the remainder of this section.

The AS system was constructed as shown on the piping and instrumentation diagram (P&ID), Figure 2-6, and includes a rotary screw air compressor/refrigerated air dryer package, receiver tank, air filters, condensate management system, manifold control leg assemblies, instruments, and main control panel (MCP).

A rotary screw air compressor package was fabricated by the manufacturer as an integrated enclosure package containing the rotary screw compressor with a variable frequency drive (VFD), moisture separator, refrigerated air dryer, controls, condensate drains, programmable logic controller (PLC), and human/machine interface (HMI) screen. Compressed air is generated via a 50-horsepower (HP) rotary screw air compressor capable of 185 cubic feet per minute (cfm) of air at up to 181 psig at the discharge of the air compressor. The compressor motor is totally enclosed, fan-cooled, and premium efficiency rated. A moisture separator is installed following the compressor for primary removal of condensate and potential carryover oil. A refrigerated air dryer then reduces the dew point of the air stream and reduces moisture content to prevent downstream condensate accumulation in the process system and distribution piping. Temperature and dew point sensors and transmitters are installed within the air dryer. The dew point transmitter is interlocked with an air dryer to control motor speed and cycling to maintain a target dew point of less than 50 degrees Fahrenheit (°F).

Following the air dryer, compressed air enters a 120-gallon receiver tank that includes a no-loss condensate auto-drain, manual drain, pressure relief valve, pressure gauge, pressure transmitter, and discharge solenoid valve. The rotary screw air compressor cycles via the VFD to maintain a receiver tank pressure of 90 psig. Following the receiver tank, remaining carryover oil present in the air stream is removed via two oil coalescing filters and one granular activated carbon filter, each installed in series. Following air filtration, main compressed air line sensors/transmitters measure total air flow, line pressure, temperature, and relative humidity for display at the MCP. Each assembly leg has a pressure gauge and temperature gauge that can be read locally.

Thereafter, compressor air is distributed to the six compressed air manifold legs plumbed to the six AS zones. Each manifold leg includes a gate valve, solenoid valve, pressure regulator, flow sensor, indicator, and transmitter, pressure sensor and transmitter, pressure gauge, and check valve,. Each leg extends to the exterior of the system and stub-outs with a 2-inch male National Pipe Thread (NPT) threaded termination. The compressed air hose then connects the stub-outs to the headers installed to convey compressed air to each distribution manifold and then individually to each AS well. The compressed air distribution system was installed with 4 spare manifold legs that are not connected to any AS wells or zones. The unused manifold legs were capped.

The fluids from the oil coalescing filters and carbon filter drain to the condensate management system. Condensate from the compressor moisture separator, air dryer, and receiver tank is also conveyed through tubing to the condensate management system for treatment. In the condensate management system, condensate passes through two oleophillic filters for bulk oil removal followed by two activated carbon chambers that remove the remainder of the oil. Treated condensate is discharged under gravity outside the AS system trailer. Oil accumulated in the separator is staged in a container for manual removal and management, and a visual indicator shows when the oil collection chamber is full.

The system is housed in a dedicated trailer approximately 8 feet wide by 24 feet long and secured with tie-down-style straps for anchoring. A split type air conditioner is installed in the trailer and is sized to maintain an interior temperature of 80 °F. The interior is insulated, interior lighting is provided with standard lamps with a common switch, and two standard 120-volt, 20-amp, ground fault circuit interrupter (GFCI) electrical outlets have been installed.

The AS system is controlled by a dedicated PLC-based system MCP capable of remote controls and shutdown, internet-based data retrieval, and alarm notification via email, text message, and voice message. The interface is capable of easily programming timed intervals to control solenoid valve open/closed cycles for the system discharge manifolds. Transmitters are installed to monitor and log total system flow, pressure, and temperature data following the compressor

and air dryer; pressure at the receiver; flow, pressure, temperature, and relative humidity prior to distribution; and flow and pressure at each manifold leg.

The HMI interface can display different screens including the following:

- Main menu for system operation;
- System schematic showing compressor discharge flow rate and temperature, trailer interior temperature, receiver tank pressure, and receiver discharge solenoid valve position; receiver discharge flow rate, pressure, temperature, and relative humidity; and manifold leg solenoid valve position, flow rate, and pressure of each manifold leg;
- Hand-Off-Automatic (HOA) switches for the compressor and main compressed air line solenoid valve; trailer interior temperature and set point; compressor discharge temperature and alarm set point; compressor discharge pressure, high pressure alarm set point, and low pressure alarm set point; receiver tank pressure, high pressure alarm set point, and low pressure alarm set point; receiver tank discharge flow rate, high flow rate alarm set point, and low flow rate alarm set point; and receiver discharge relative humidity and high relative humidity alarm set point;
- Display of cycles and corresponding manifold legs for each cycle;
- On and off times for each cycle;
- HOA switches for manifold leg solenoid valves;
- Flow rates and high flow rate alarms for each manifold leg;
- Run time meters for the compressor and solenoid valve (open position) of each manifold leg;
- Pressure, high pressure alarm set point, and low pressure alarm set point for each manifold leg; and
- Flow rate and pressure trends for each leg.

The electrical work was performed by a New Energy Service, Inc. of Titusville, Florida. The system fabrication was conducted in conformance with the National Electric Code, American Society of Mechanical Engineers, and relevant local, state, and federal standards and codes. The

AS system was fully electrically and mechanically shop tested and inspected prior to delivery to the site.

2.7 SITE RESTORATION

In areas where pavement on the roadway was cut during the piping install, the deeper portions of trenches were backfilled with native material in approximately 6-inch lifts. Each lift was compacted by tamping with the excavator bucket and flooding the trench to remove any additional air voids. All removed native soil was added to the trenches in this way, and then lime rock was added to match grade until asphalt activities were completed. Lime rock was placed in a similar manner to the native soil (i.e., 6-inch lifts).

Trenches in the grassy areas were backfilled with native material, tamped with the excavator bucket, and graded to match the surrounding area. The area was then reseeded and watered to promote grass growth.

Table 2-1. Air Sparging Well Construction Summary

Well ID (39A-)	Manifold Zone	Zone Letter	Well Diameter (inch)	Screen Interval (feet bls)	Screen Type	Angled Boring	Boring Angle (degrees)	Boring Length (feet)	Easting (meters)	Northing (meters)
AS-001	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238558.45	473793.79
AS-002	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238542.56	473799.68
AS-003	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238554.20	473808.23
AS-004	NWS	A	1	35-37	40-micron Schumaprobe	Yes	59.7	42.8	238554.61	473817.07
AS-005	NWS	A	1	35-37	40-micron Schumaprobe	Yes	48.7	49.2	238544.64	473815.91
AS-006	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238548.11	473820.55
AS-007	NWS	A	1	35-37	40-micron Schumaprobe	Yes	55.3	45.0	238547.64	473828.57
AS-008	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238542.02	473832.73
AS-009	NWS	A	1	35-37	40-micron Schumaprobe	Yes	72.3	38.8	238531.56	473835.90
AS-010	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238512.09	473830.19
AS-011	NWS	A	1	35-37	40-micron Schumaprobe	Yes	62.5	41.7	238512.90	473818.54
AS-012	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238493.11	473832.73
AS-013	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238481.04	473832.72
AS-014	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238535.74	473844.88
AS-015	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238523.70	473844.90
AS-016	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238511.62	473844.90
AS-017	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238499.45	473844.91
AS-018	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238487.25	473844.92
AS-019	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238475.08	473844.92
AS-020	NWS	A	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238462.88	473844.91
AS-021	NW-SW	B	1	35-37	40-micron Schumaprobe	Yes	84.0	39.2	238526.73	473798.59
AS-022	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238512.09	473799.68
AS-023	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238496.79	473799.76
AS-024	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238473.70	473805.16
AS-025	NW-SW	B	1	35-37	40-micron Schumaprobe	Yes	74.2	38.5	238453.47	473802.65
AS-026	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238437.13	473805.17
AS-027	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238423.18	473813.72
AS-028	NW-SW	B	1	35-37	40-micron Schumaprobe	Yes	70.1	39.4	238502.55	473811.24
AS-029	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	38.0	238489.21	473814.94
AS-030	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238474.95	473820.56
AS-031	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238462.77	473820.54
AS-032	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238450.58	473820.51
AS-033	NW-SW	B	1	35-37	40-micron Schumaprobe	Yes	77.9	37.8	238432.28	473829.30
AS-034	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238413.30	473827.81
AS-035	NW-SW	B	1	35-37	40-micron Schumaprobe	Yes	72.7	39.7	238467.23	473829.62
AS-036	NW-SW	B	1	35-37	40-micron Schumaprobe	Yes	75.2	39.3	238457.66	473829.92
AS-037	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238444.48	473832.74
AS-038	NW-SW	B	1	35-37	40-micron Schumaprobe	Yes	53.0	47.3	238446.70	473837.43
AS-039	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238438.50	473844.93
AS-040	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238423.29	473842.52
AS-041	NW-SW	B	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238415.21	473855.08
AS-042	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238517.62	473857.13
AS-043	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238505.58	473857.13
AS-044	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238493.39	473857.13
AS-045	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238481.19	473857.14
AS-046	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238468.98	473857.11
AS-047	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238456.81	473857.13

Table 2-1. Air Sparging Well Construction Summary (Continued)

Well ID (39A-)	Manifold Zone	Zone Letter	Well Diameter (inch)	Screen Interval (feet bls)	Screen Type	Angled Boring	Boring Angle (degrees)	Boring Length (feet)	Easting (meters)	Northing (meters)
AS-048	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238444.61	473857.11
AS-049	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238432.42	473857.14
AS-050	NW-N	C	1	35-37	40-micron Schumaprobe	Yes	50.8	40.8	238518.91	473868.38
AS-051	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238505.29	473874.68
AS-052	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238488.95	473874.72
AS-053	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238470.74	473874.75
AS-054	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238455.66	473874.53
AS-055	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238440.42	473874.50
AS-056	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238426.17	473869.31
AS-057	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238415.62	473874.71
AS-058	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238498.18	473893.00
AS-059	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238479.83	473892.97
AS-060	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238463.30	473889.74
AS-061	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238448.06	473889.75
AS-062	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238432.80	473889.76
AS-063	NW-N	C	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238470.64	473911.16
AS-064	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238417.57	473889.73
AS-065	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238401.68	473894.73
AS-066	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238386.81	473887.66
AS-067	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238452.41	473911.27
AS-068	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238434.12	473911.26
AS-069	NWDG	D	1	35-37	40-micron Schumaprobe	Yes	68.6	39.7	238415.84	473911.30
AS-070	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	47.0	238372.97	473905.40
AS-071	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238461.56	473929.57
AS-072	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238443.27	473929.52
AS-073	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238428.61	473925.91
AS-074	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	44.0	238355.15	473920.31
AS-075	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	42.0	238381.06	473932.71
AS-076	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238364.15	473936.56
AS-077	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238434.12	473947.84
AS-078	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	45.0	238393.62	473947.01
AS-079	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	40.0	238373.34	473949.86
AS-080	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	48.0	238416.04	473959.76
AS-081	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238386.45	473962.30
AS-082	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238367.11	473962.87
AS-083	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238395.57	473974.69
AS-084	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238375.42	473975.05
AS-085	NWDG	D	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238359.19	473977.03
AS-086	NS	E	1	35-37	40-micron Schumaprobe	Yes	50.8	47.8	238668.15	473811.02
AS-087	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238663.00	473814.96
AS-088	NS	E	1	35-37	40-micron Schumaprobe	Yes	53.7	45.9	238692.52	473820.85
AS-089	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238691.00	473821.35
AS-090	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238700.10	473827.74
AS-091	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238684.86	473827.77
AS-092	NS	E	1	35-37	40-micron Schumaprobe	Yes	65.7	40.6	238666.76	473823.52
AS-093	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238653.82	473833.32
AS-094	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238705.26	473842.88

Table 2-1. Air Sparging Well Construction Summary (Continued)

Well ID (39A-)	Manifold Zone	Zone Letter	Well Diameter (inch)	Screen Interval (feet bls)	Screen Type	Angled Boring	Boring Angle (degrees)	Boring Length (feet)	Easting (meters)	Northing (meters)
AS-095	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238692.49	473842.98
AS-096	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238677.23	473842.98
AS-097	NS	E	1	35-37	40-micron Schumaprobe	Yes	43.2	54.0	238703.08	473855.55
AS-098	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238700.09	473858.24
AS-099	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238684.85	473858.21
AS-100	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238662.97	473851.63
AS-101	NS	E	1	35-37	40-micron Schumaprobe	Yes	63.2	41.5	238702.97	473872.62
AS-102	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238692.48	473873.47
AS-103	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238675.81	473869.93
AS-104	NS	E	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238653.84	473869.90
AS-105	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238700.83	473888.92
AS-106	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238684.85	473888.71
AS-107	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238670.71	473888.67
AS-108	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238652.41	473888.82
AS-109	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238679.85	473907.12
AS-110	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238661.54	473907.11
AS-111	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238643.29	473907.07
AS-112	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238652.42	473925.38
AS-113	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238661.58	473943.70
AS-114	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238643.26	473943.71
AS-115	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238652.42	473961.97
AS-116	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238661.36	473980.18
AS-117	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238643.33	473980.27
AS-118	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238670.60	473998.47
AS-119	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238652.41	473998.55
AS-120	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238634.13	473998.55
AS-121	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238661.54	474016.84
AS-122	NDG	F	1	35-37	40-micron Schumaprobe	No	90.0	37.0	238643.23	474016.80

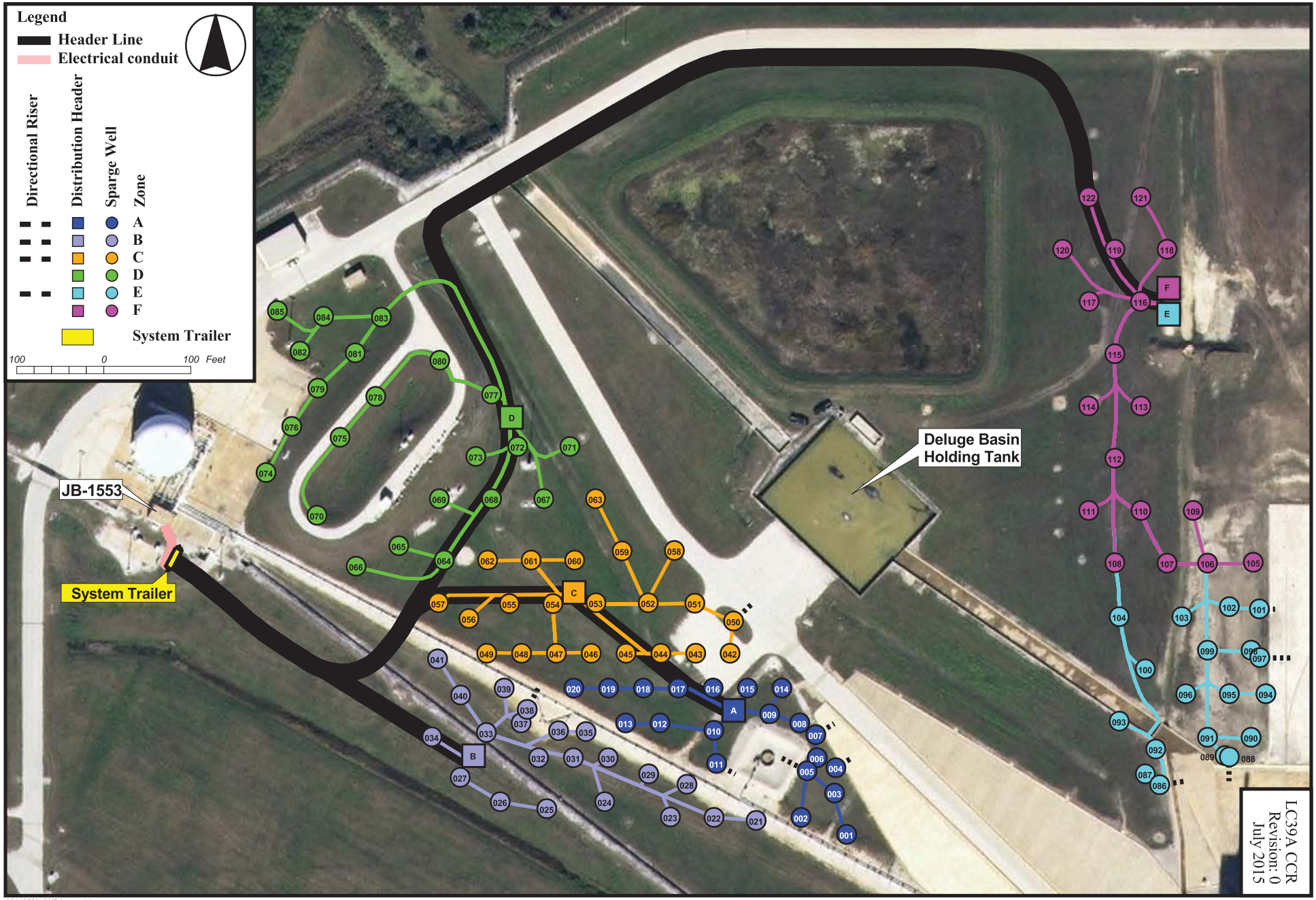
bls - Below land surface.
NDG - North Plume, downgradient area.
NS - North Plume, source area.
NWDG - Northwest Plume, downgradient area.
NWS - Northwest Plume, source area.
NW-N - Northwest Plume, northern area.
NW-SW - Northwest Plume, southwestern area.

Table 2-2. New Monitoring Well Construction Details

Well ID	Easting (meters)	Northing (meters)	Top of Casing Elevation (ft above msl)	Ground Surface Elevation (ft above msl)	Screened Interval	
					Top (ft bls)	Bottom (ft bls)
39A-21ST-MW31I	238435.02	473900.96	TBD	4.76	23	28
39A-21ST-MW32I	238427.20	473937.29	TBD	4.22	23	28

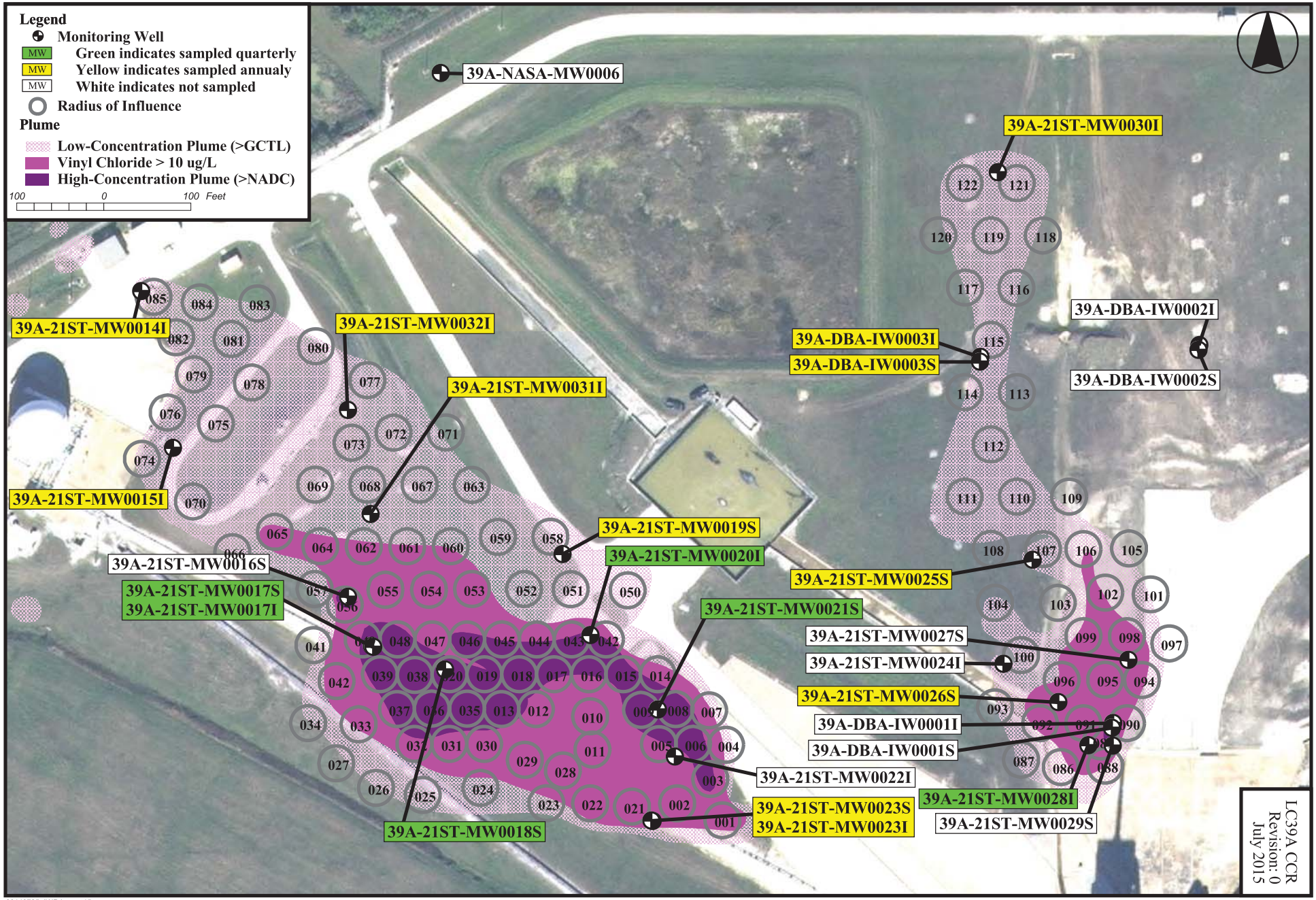
ft above msl - Feet above mean sea level.
ft bls - Feet below land surface.
TBD - to be determined.

FIGURE 2-1 HEADER AND LATERAL TRENCHING LAYOUT MAP
SWMU 008, KENNEDY SPACE CENTER, FLORIDA



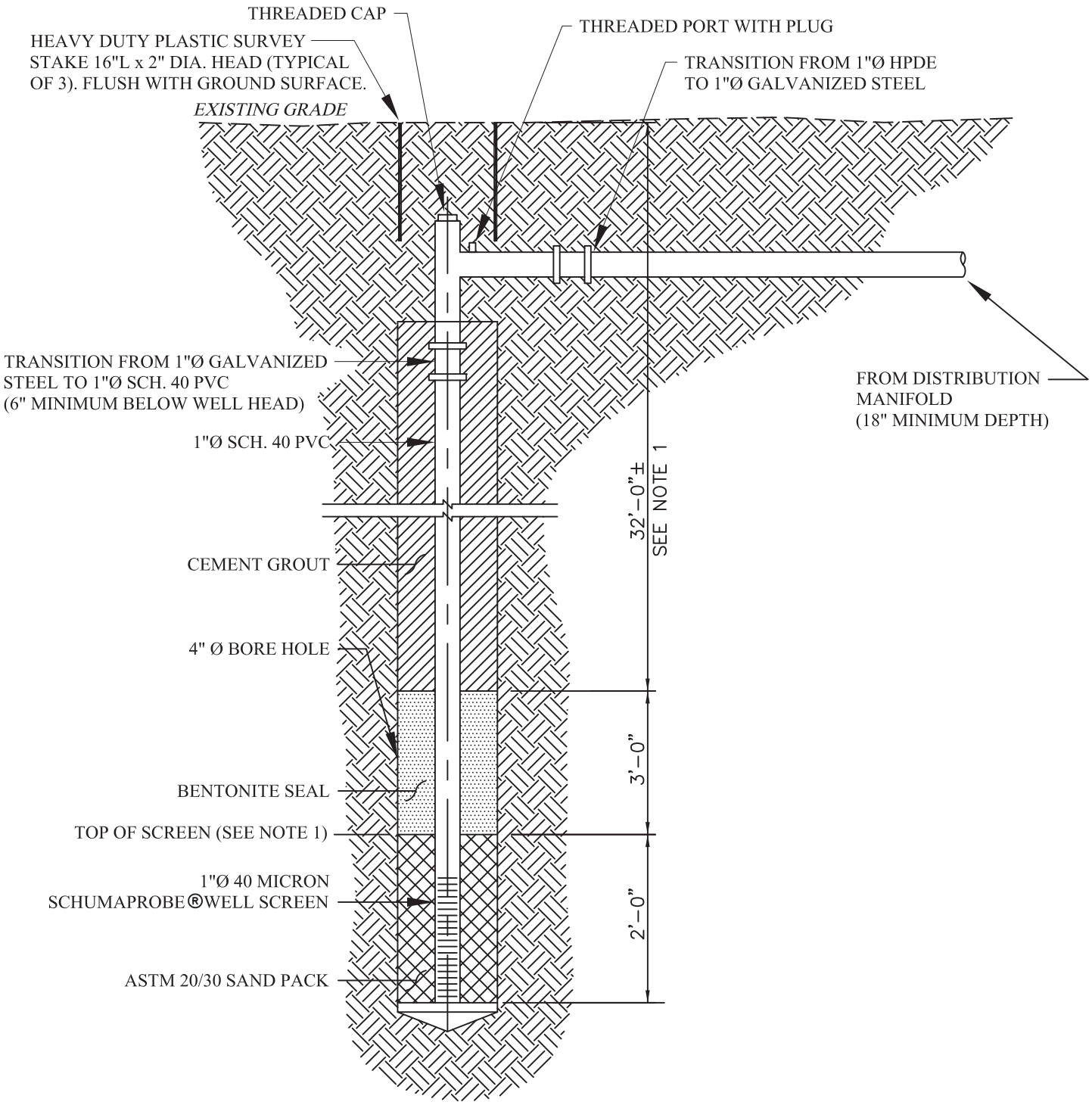
20140725_IWP Layout11

FIGURE 2-2 PERFORMANCE MONITORING LAYOUT
SWMU 008, KENNEDY SPACE CENTER, FLORIDA



20140725_IWP Layout15

FIGURE 2-3 AIR SPARGING WELL CONSTRUCTION DETAIL
LC39A HCP/LCP, KENNEDY SPACE CENTER, FLORIDA



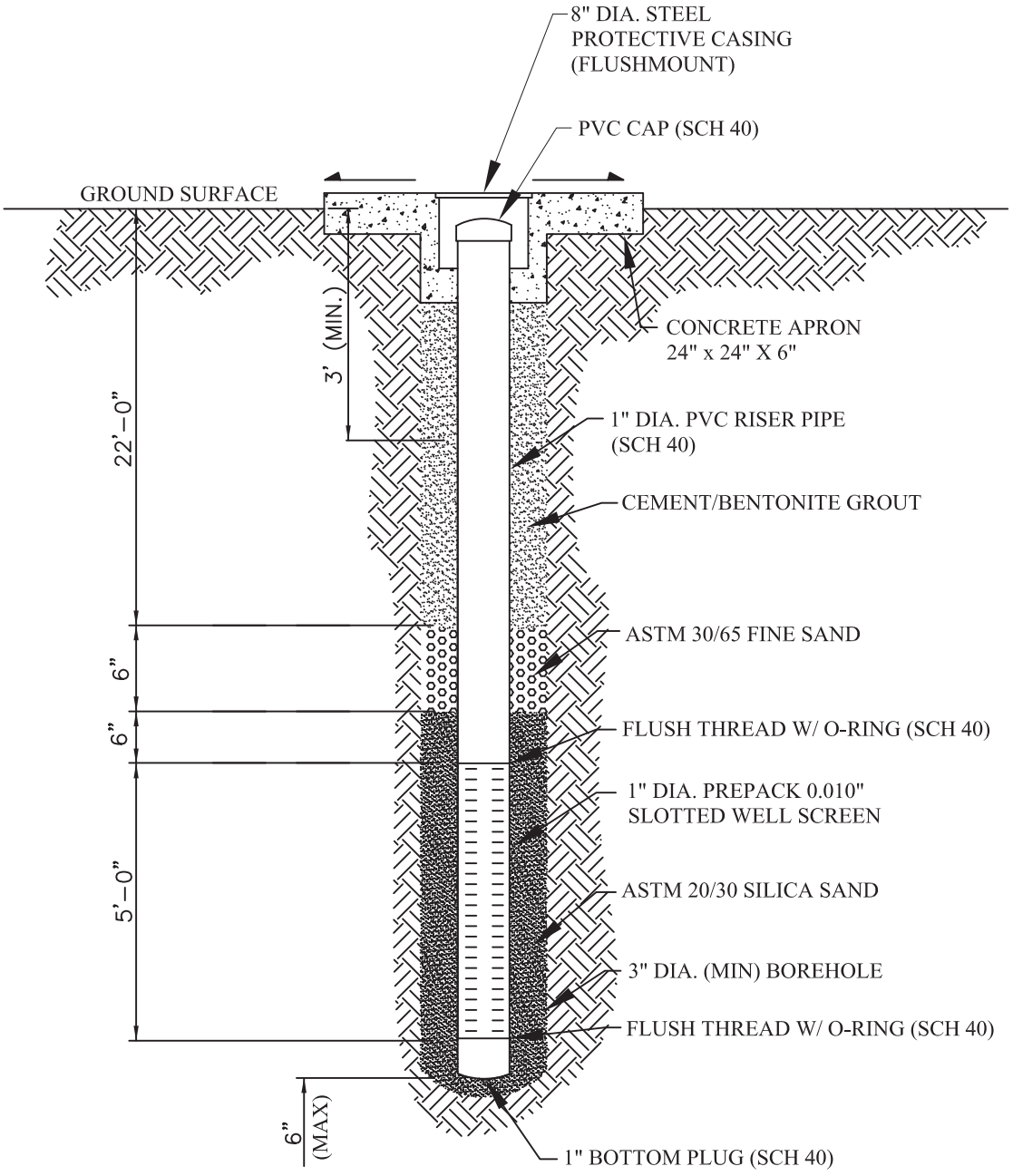
AIR SPARGE WELL DETAIL

NOT TO SCALE

NOTES:

1. INCREASED DEPTH WITHIN FOOTPRINT OF CAMERA PAD HILL TO MAINTAIN CONSISTENT BOTTOM ELEVATION. ALSO, LENGTH ADJUSTED IN ANGLED WELLS TO MEET DESIRED DEPTH.

FIGURE 2-4 MONITORING WELL CONSTRUCTION DETAIL
LC39A HCP/LCP, KENNEDY SPACE CENTER, FLORIDA



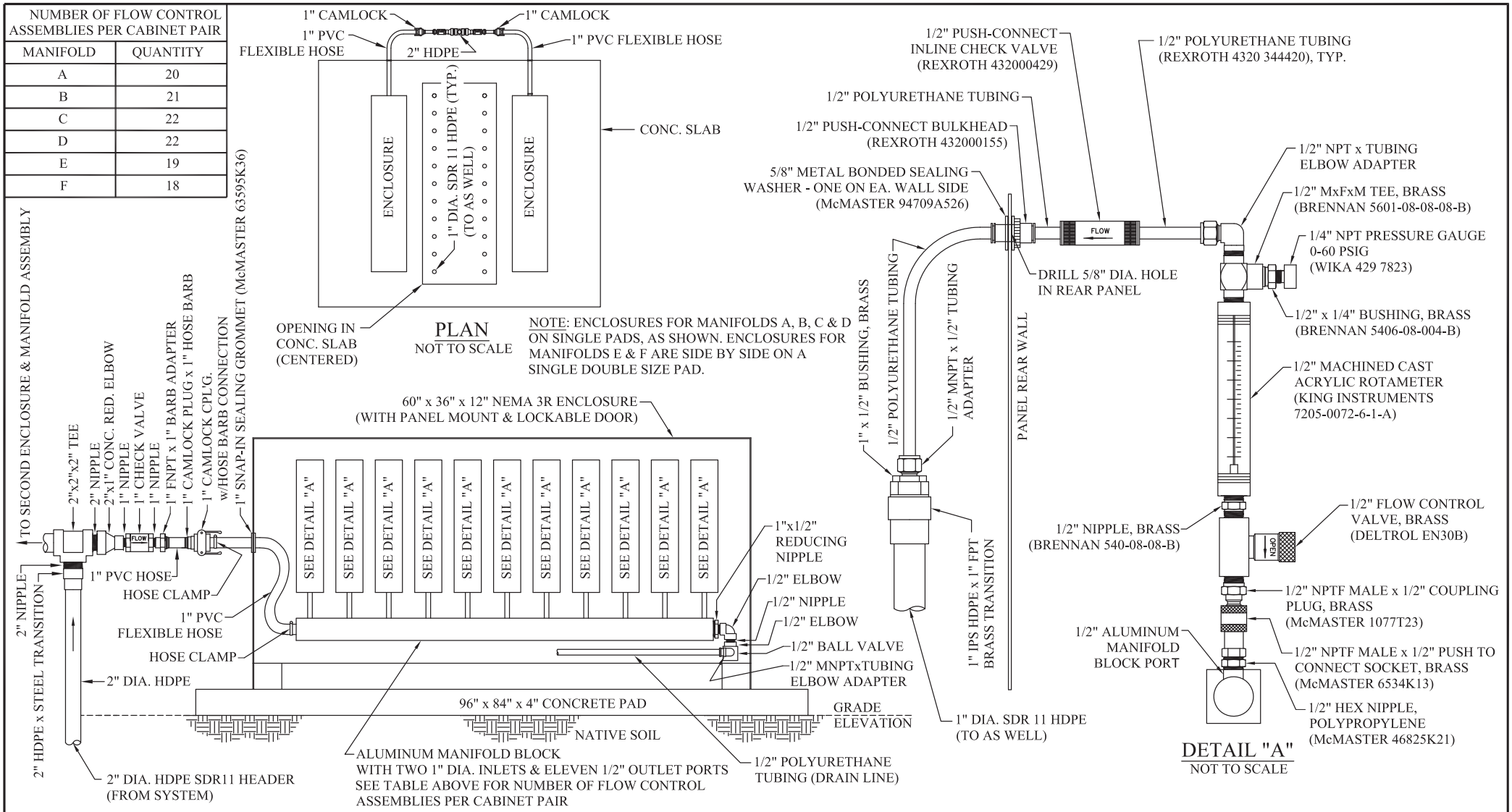
GROUNDWATER MONITORING WELL DETAIL

NOT TO SCALE

FIGURE 2-5 DISTRIBUTION MANIFOLD CONSTRUCTION DETAIL

LC39A HCP/LCP, KENNEDY SPACE CENTER, FLORIDA
SCALE: NOT TO SCALE

NUMBER OF FLOW CONTROL ASSEMBLIES PER CABINET PAIR	
MANIFOLD	QUANTITY
A	20
B	21
C	22
D	22
E	19
F	18



DISTRIBUTION MANIFOLD CONSTRUCTION DETAIL

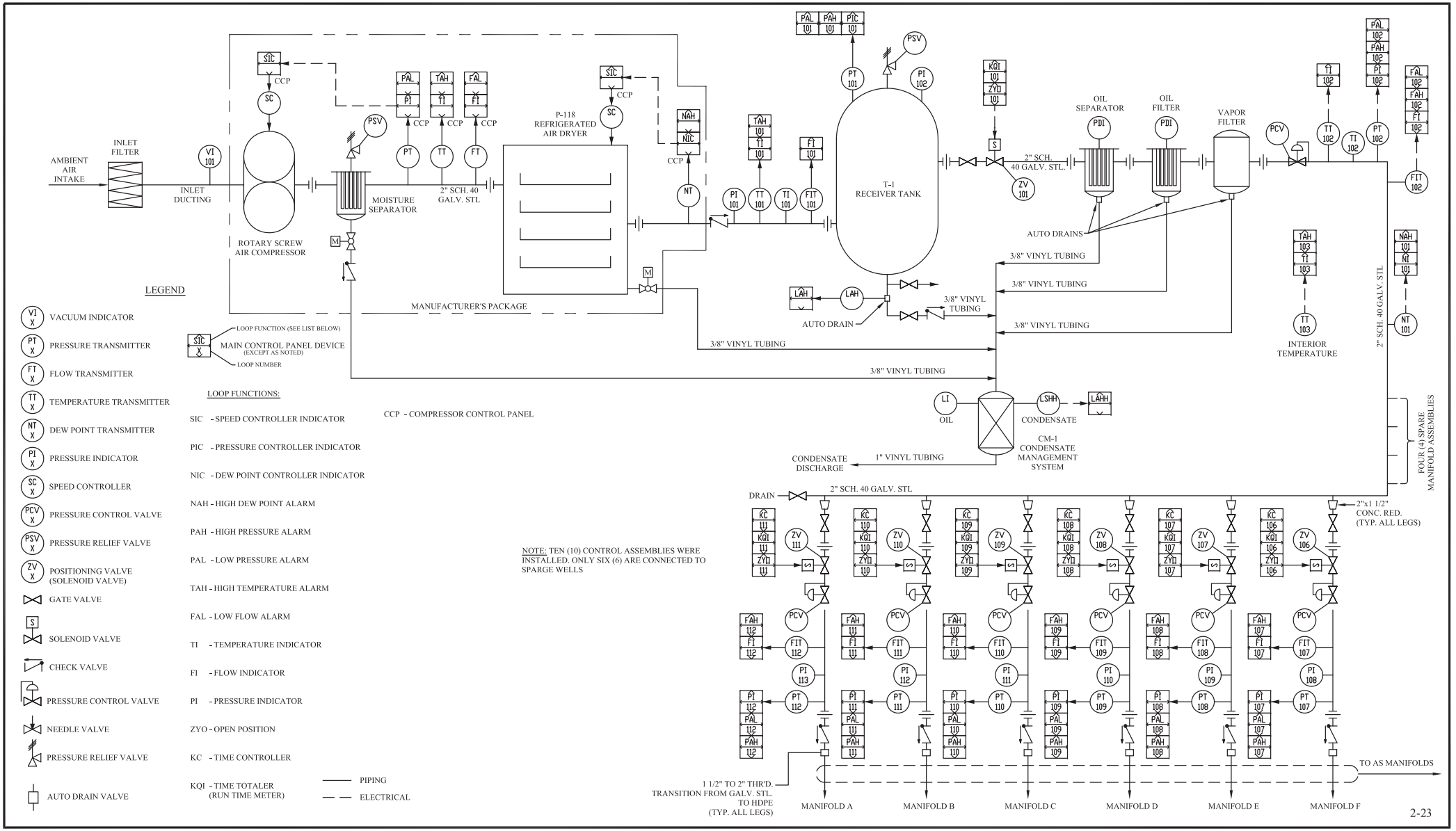
NOT TO SCALE

Q:\Projects\Kennedy Space Center\LC39A HCP_LCP\FIGURE 2-5.dwg PIT BOB.BUTT 5/11/2015 7:45:48 AM

FIGURE 2-6 AIR SPARGING PIPING AND INSTRUMENTATION DIAGRAM

LC39A HCP/LCP, KENNEDY SPACE CENTER, FLORIDA

SCALE: NOT TO SCALE



Q:\Projects\Kennedy Space Center\LC39A HCP_LCP\FIGURE 2-6.dwg PIT BOB.BUTT 5/11/2015 7:46:50 AM

SECTION III

BASELINE SAMPLING

Baseline groundwater sampling and water level measurements were completed in December 2014, and baseline air sampling was conducted in January 2015. Water level measurements were only collected from the 17 wells that were sampled during the baseline event. Groundwater analytical results obtained through the first year of AS operation to monitor system performance will be presented in the OM&M Report and Step 4 EE. Monitoring well installation and groundwater sampling activities were conducted in accordance with the Sampling and Analysis Plan (SAP) for the RCRA Corrective Action Program at KSC (NASA, 2011) and FDEP Standard Operating Procedure (SOP) FS 2200 (2008).

3.1 WATER LEVELS AND GROUNDWATER FLOW DIRECTION

Water levels were measured in 17 monitoring wells from December 13 to 15, 2014, and were used to determine groundwater elevations in feet above msl (see Table 3-1). A list of the selected performance monitoring wells is provided in Table 3-2.

Groundwater elevations for shallow and intermediate wells are shown on Figures 3-1 and 3-2, respectively. Based on these results, the groundwater flow direction for both the shallow and intermediate groundwater zones is to the northwest, which is consistent with the results from November 2012 for the Step 1 EE.

3.2 GROUNDWATER SAMPLING

Two monitoring wells were installed to aid in evaluation of the AS system performance and to determine whether the system is adequately progressing towards IM objective. In addition to the new wells, 16 existing monitoring wells were selected to aid in performance monitoring. For the baseline sampling, groundwater samples were collected from 17 monitoring wells in December 2014 to determine baseline conditions prior to the start of AS system operations. (Monitoring

well 21ST-MW20I was added to the monitoring program after the baseline samples were collected.) A peristaltic pump was used for purging and sampling, and samples for VOC analysis were collected using the "soda-straw" technique. Samples were submitted to ALS Environmental Laboratories of Florida for analysis of VOCs via Method SW-846 8260B. The results of baseline groundwater sampling for TCE, cDCE, and VC are summarized in Table 3-3 and on Figure 3-3. Groundwater sampling log sheets and chain-of-custody forms are provided in Appendix D, and laboratory analytical results for baseline groundwater samples are provided in Appendix E.

TCE was detected in 3 of 17 monitoring wells during baseline sampling at concentrations ranging from 4.7 to 16 µg/L. The three detected concentrations of TCE exceeded the GCTL of 3 micrograms per liter (µg/L), and the maximum TCE concentration was detected at MW0018S. cDCE was detected in 14 of 17 baseline monitoring wells at concentrations ranging from 0.46 to 29 µg/L. None of the detected concentrations of cDCE exceeded the GCTL of 70 µg/L, and the maximum cDCE concentration was detected at MW0021S. trans-1,2-Dichloroethene (tDCE) was detected in 12 of 17 baseline monitoring wells at concentrations ranging from 0.12 to 3.2 µg/L. None of the detected concentrations of tDCE exceeded the GCTL of 100 µg/L, and the maximum tDCE concentration was detected at MW0014I. VC was detected in 12 of 17 baseline monitoring wells at concentrations ranging from 0.88 to 21 µg/L. Eleven of the 12 detected concentrations of VC exceeded the GCTL of 1 µg/L, and the maximum VC concentration was detected at MW0026S.

Overall, the baseline groundwater monitoring event did not match pre-IM conditions established during DPT investigation activities. Fifteen wells were sampled for the baseline event that had been sampled in earlier events. COC concentrations decreased in five of these 15 wells and increased in two wells. There were essentially no changes in COC concentrations in six wells and mixed results (that is, increases for some COCs and decreases for other COCs) in two wells. Groundwater mixing is anticipated to occur following initiation of the IM, and concentrations during the first performance monitoring event may vary (in some cases increase) from baseline concentrations.

3.3 AIR SAMPLING

Air samples were collected from one location near the Zone A distribution manifold on January 24, 2014, to determine baseline conditions prior to the start of AS system operations. A Summa canister was deployed for the collection of an 8-hour time-weighted average (TWA) sample, and the sample was submitted to ALS of Simi Valley, California, for analysis of VOCs via United States Environmental Protection Agency (EPA) Method TO-15. The results of baseline air sampling for TCE, cDCE, tDCE, and VC are summarized in Table 3-4. TCE, cDCE, and VC concentrations were less than detection limits at the air sampling location during baseline sampling. The air sample chain-of-custody form is provided in Appendix E along with the laboratory analytical results in the laboratory report.

Table 3-1. Water Level Measurements and Groundwater Elevations

Well ID	Ground Surface Elevation (feet above msl)	T.O.C. Elevation (feet above msl)	12/13/14 - 12/15/14	
			Depth to Water (feet below T.O.C.)	Groundwater Elevation (feet above msl)
21ST-MW14I	9.79	9.45	5.06	4.39
21ST-MW15I	19.65	19.29	14.90	4.39
21ST-MW17I	9.93	9.57	5.01	4.56
21ST-MW17S	9.95	9.65	5.05	4.60
21ST-MW18S	8.42	8.32	3.63	4.69
21ST-MW19S	9.37	9.16	4.50	4.66
21ST-MW20I	8.27	7.95	NM	NM
21ST-MW21S	8.36	8.16	3.10	5.06
21ST-MW23I	10.65	10.47	5.25	5.22
21ST-MW23S	10.58	10.35	5.12	5.23
21ST-MW25S	7.83	7.68	2.57	5.11
21ST-MW26S	8.10	7.94	2.48	5.46
21ST-MW28I	7.64	7.57	1.98	5.59
21ST-MW30I	8.19	8.04	3.53	4.51
21ST-MW31I	4.76	TBD	3.50	TBD
21ST-MW32I	4.22	TBD	3.05	TBD
DBA-IW03I	6.24	TBD	3.30	TBD
DBA-IW03S	6.24	TBD	3.10	TBD

T.O.C. - Top of casing.
msl - Mean sea level.
TBD - To be determined.

Table 3-2. Performance Monitoring Plan

Well ID (39A-)	Screen Interval, feet bls	HCP/ LCP	Frequency[1,2]	Analytes	
				VOCs	Field Parameters
Northwest Plume					
21ST-MW23S	15-20	LCP	Annually[1]	✔	✔
21ST-MW23I	30-35	LCP	Annually	✔	✔
21ST-MW21S	15-20	HCP	Quarterly[2]	✔	✔
21ST-MW20I	23-28	HCP	Quarterly	✔	✔
21ST-MW18S	13-18	HCP	Quarterly	✔	✔
21ST-MW17S	14-19	HCP	Quarterly	✔	✔
21ST-MW17I	30-35	HCP	Quarterly	✔	✔
21ST-MW19S	15-20	LCP	Annually	✔	✔
21ST-MW31I	23-28	LCP	Annually	✔	✔
21ST-MW32I	23-28	LCP	Annually	✔	✔
21ST-MW15I	36-41	LCP	Annually	✔	✔
21ST-MW14I	22-27	LCP	Annually	✔	✔
North Plume					
21ST-MW28I	22-27	HCP	Quarterly	✔	✔
21ST-MW26S	15-20	LCP	Annually	✔	✔
21ST-MW25S	12-17	LCP	Annually	✔	✔
DBA-IW03S	7-17	LCP	Annually	✔	✔
DBA-IW03I	33-37	LCP	Annually	✔	✔
21ST-MW30I	20-25	LCP	Annually	✔	✔

1 - Annually - Annually starting at the second quarterly event for six events.
2 - Quarterly - Quarterly for four events followed by four semi-annual events.
Field parameters - dissolved oxygen, pH, oxidation-reduction potential, water level, temperature, and conductivity.
ft bls - feet below land surface.
HCP - High-concentration plume.
LCP - Low-concentration plume.
VOCs - Volatile organic compounds.

Table 3-3. Baseline Groundwater Results for TCE, cDCE, tDCE, and VC

Well/ Screened Interval	Sample Date	TCE	cDCE	tDCE	VC
39A-21ST-MW0014I [22-27]	12/14/2014	0.16 U	**1.1**	**3.2**	**3.7**
39A-21ST-MW0015I [36-41]	12/14/2014	0.16 U	**1.2**	**1.7**	**1.7**
39A-21ST-MW0017I [30-35]	12/13/2014	0.16 U	**0.84 J**	**1.7**	0.22 U
39A-21ST-MW0017S [14-19]	12/13/2014	0.16 U	0.36 U	0.12 U	**1.3**
39A-21ST-MW0018S [13-18]	12/13/2014	**16**	**22**	0.12 U	**2.7**
39A-21ST-MW0019S [15-20]	12/13/2014	0.16 U	**7.3**	**0.28 J**	**7.6**
39A-21ST-MW0021S [15-20]	12/13/2014	0.16 U	**29**	**0.19 J**	**0.88 J**
39A-21ST-MW0023I [30-35]	12/13/2014	0.16 U	**0.46 J**	**0.8 J**	0.22 U
39A-21ST-MW0023S [15-20]	12/13/2014	**5.1**	**4.7**	0.12 U	**2.9**
39A-21ST-MW0025S [12-17]	12/14/2014	0.16 U	**0.48 J**	**0.12 J**	0.22 U
39A-21ST-MW0026S [15-20]	12/14/2014	0.16 U	**2.3**	**1**	**21**
39A-21ST-MW0028I [22-27]	12/14/2014	0.16 U	**5.3**	**0.33 J**	**11**
39A-21ST-MW0030I [20-25]	12/14/2014	0.16 U	**9.1**	**0.42 J**	**6.8**
39A-21ST-MW0031I [23-28]	12/13/2014	0.16 U	**0.51 J**	**0.86 J**	**1.7**
39A-21ST-MW0032I [23-28]	12/13/2014	**4.7**	**1.7**	**1.5**	**7.3**
39A-DBA-IW0003I [33-37]	12/15/2014	0.16 U	0.36 U	0.12 U	0.22 U
39A-DBA-IW0003S [7-17]	12/15/2014	0.16 U	0.36 U	0.12 U	0.22 U

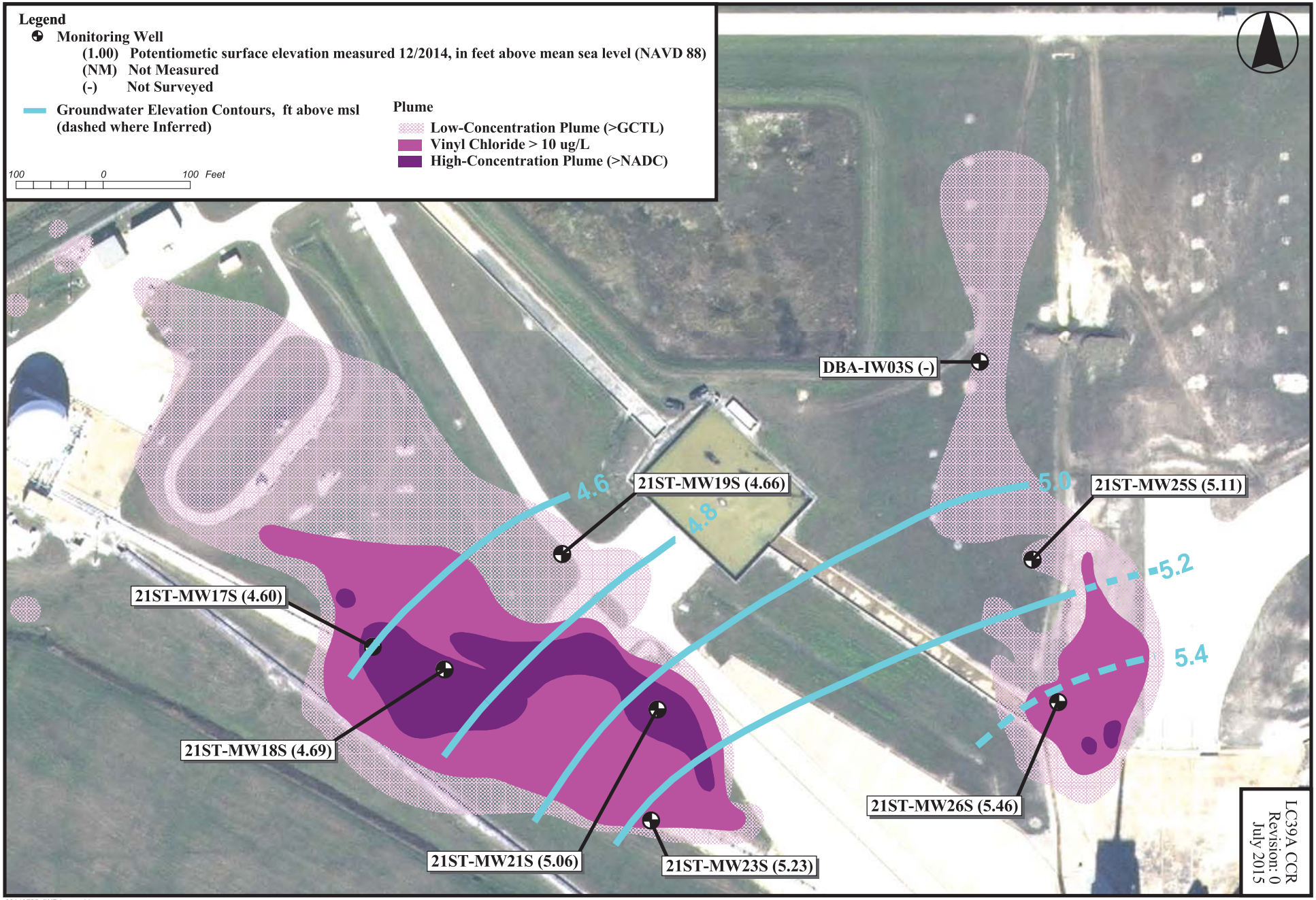
Concentrations in µg/L.
TCE = Trichloroethene.
tDCE = trans-1,2-Dichloroethene.
cDCE = cis-1,2-Dichloroethene.
VC = Vinyl chloride.
Shading indicates GCTL exceedence, TCE = 3 µg/L, cDCE = 70 µg/L, tDCE = 100 µg/L, and VC = 1 µg/L.
J = Estimated concentration.
U = Not detected at or above MDL (associated value).

Table 3-4. Baseline and Start-up Air Monitoring Results Summary

	Baseline Air				Startup Air [1]				Groundwater	Occupational Exposure Limits (OEL)					Data Evaluation					
Compound[2]	Baseline Air Result ug/m3	Baseline Air Result mg/m3	Baseline Air Result ppbV	Baseline Air Result ppmV	Max. Air Result ug/m3	Max. Air Result mg/m3	Max. Air Result ppbV	Max. Air Result ppmV	Baseline Conc. (MW-21S) ug/l	OSHA PEL ppmV	OSHA PEL mg/m3	Source	ACGIH TLV ppmV	Source	Lowest OEL ppmV	Comparison Conc. ppmV	Does Comparison Conc. Exceed OEL?	Lowest OEL mg/m3	Comparison Conc. mg/m3	Does Comparison Conc. Exceed OEL?
Dichlorodifluoromethane	2.3	0.0023	0.47	0.00047	2.3	0.0023	0.46	0.00046	20U	1,000	4,950	Z-1 Table	1,000	Z-1 Table	1,000	0.00046	No	4,950	0.0023	No
Chloromethane	0.49	0.00049	0.24	0.00024	0.56	0.00056	0.27	0.00027	1U	100	NV	Z-2 Table	50	Z-2 Table	50	0.00027	No	NV	0.00056	--
Acetone	6.9	0.0069	2.9	0.0029	15	0.015	6.4	0.0064	50U	1,000	2,400	Z-1 Table	500	Z-1 Table	500	0.0064	No	2,400	0.015	No
Trichlorofluoromethane	1.3	0.0013	0.22	0.00022	1.3	0.0013	0.23	0.00023	20U	1,000	5,600	Z-1 Table	1,000	Z-1 Table	1,000	0.00023	No	5,600	0.0013	No
Methylene Chloride	0.39	0.00039	0.11	0.00011	0.38	0.00038	0.11	0.00011	5U	NV	NV	Z-2 Table	50	Z-2 Table	50	0.00011	No	NV	0.00038	--
Trichlorotrifluoroethane	0.47	0.00047	0.061	0.000061	64	0.064	8.3	0.0083	20U	1,000	7,600	Z-1 Table	1,000	Z-1 Table	1,000	0.0083	No	7,600	0.064	No
Carbon Disulfide	ND	ND	ND	ND	0.19	0.00019	0.063	0.000063	10U	20	NV	Z-2 Table	1	Z-2 Table	1	0.000063	No	NV	0.00019	--
2-Butanone	1.2	0.0012	0.41	0.00041	1.9	0.0019	0.65	0.00065	10U	200	590	Z-1 Table	200	Z-1 Table	200	0.00065	No	590	0.0019	No
Benzene	0.41	0.00041	0.13	0.00013	1.1	0.0011	0.35	0.00035	1U	10	NV	Z-2 Table	0.5	Z-1 Table	0.5	0.00035	No	NV	0.0011	--
Carbon Tetrachloride	0.47	0.00047	0.075	0.000075	0.41	0.00041	0.065	0.000065	1U	10	NV	Z-2 Table	5	Z-2 Table	5	0.000065	No	NV	0.00041	--
Trichloroethene	ND	ND	ND	ND	0.2	0.0002	0.038	0.000038	1U	100	NV	Z-2 Table	10	Z-2 Table	10	0.000038	No	NV	0.0002	--
4-Methyl-2-pentanone	ND	ND	ND	ND	0.23	0.00023	0.057	0.000057	25U	100	410	Z-1 Table	20	Z-1 Table	20	0.000057	No	410	0.00023	No
Toluene	0.57	0.00057	0.15	0.00015	0.49	0.00049	0.13	0.00013	1U	200	NV	Z-2 Table	20	Z-2 Table	20	0.00013	No	NV	0.00049	--
2-Hexanone	ND	ND	ND	ND	0.46	0.00046	0.11	0.00011	25U	100	410	Z-1 Table	5	Z-1 Table	5	0.00011	No	410	0.00046	No
Styrene	ND	ND	ND	ND	0.41	0.00041	0.096	0.000096	1U	100	NV	Z-2 Table	20	Z-2 Table	20	0.000096	No	NV	0.00041	--

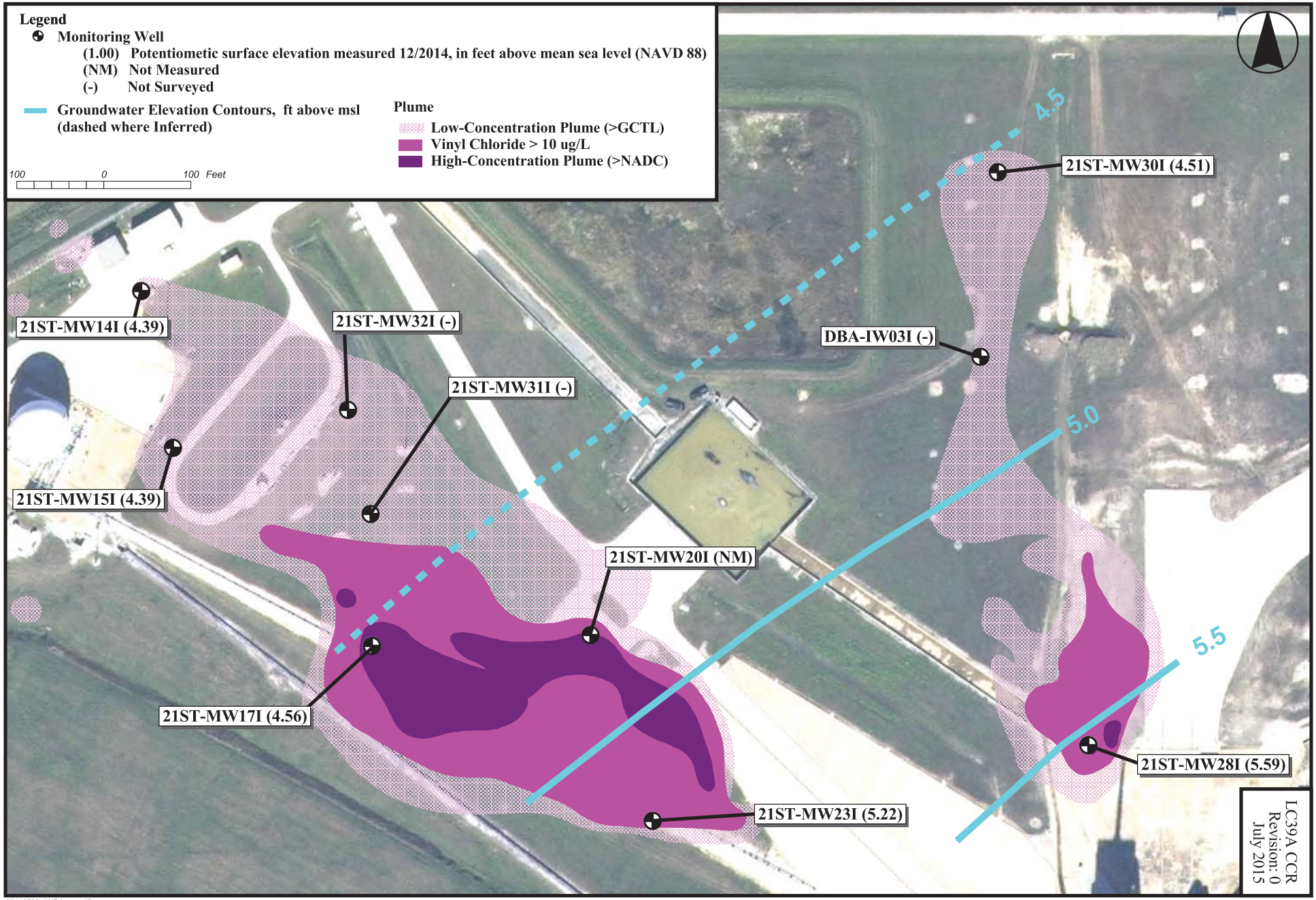
1 -Startup samples only (i.e., values or sample counts do not include baseline result).
2 - Only compounds that were detected in air samples are shown.
ACGIH TLV - American Conference of Governmental Industrial Hygienists Threshold Limit Value.
Conc. - Concentration.
Max. - Maximum.
mg/m^3 - milligrams per cubic meter.
ND - Not detected.
NV - No value.
OSHA PEL - Occupational Health and Safety Administration Permissible Exposure Limit.
ppmV - Parts per million, volume.
ug/m^3 - micrograms per cubic meter.

FIGURE 3-1 SHALLOW GROUNDWATER POTENTIOMETRIC MAP
SWMU 008, KENNEDY SPACE CENTER, FLORIDA



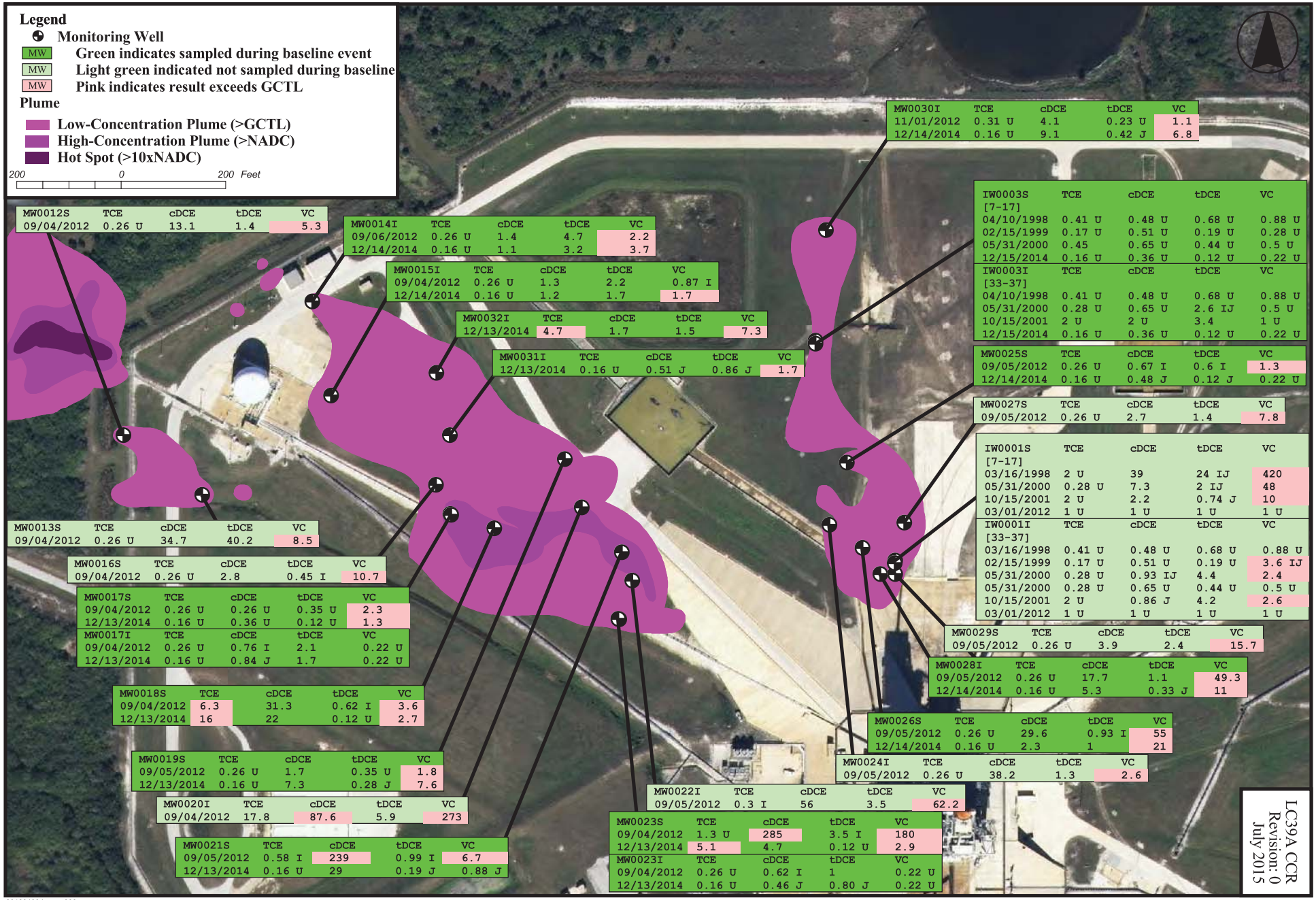
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FIGURE 3-2 INTERMEDIATE GROUNDWATER POTENTIOMETRIC MAP
SWMU 008, KENNEDY SPACE CENTER, FLORIDA



20140725_IWP Layout17

FIGURE 3-3 BASELINE GROUNDWATER SAMPLING RESULTS
SWMU 008, KENNEDY SPACE CENTER, FLORIDA



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SECTION IV

AS SYSTEM COMMISSIONING AND STARTUP

This section identifies the activities conducted during commissioning and startup of the AS system, process sampling, O&M, and evaluations conducted regarding AS system performance.

4.1 AS SYSTEM COMMISSIONING

The AS system commissioning process began on January 20, 2015, and consisted of pre-commissioning checks, functional performance tests of individual components, and functional performance system testing of combined components. The related health, safety, and emergency response procedures were in place and reviewed before this phase of operation. Motors that can be started manually (e.g., air compressor motor and cooling fan motor) were bump-tested to test equipment rotation. Initial commissioning included commissioning testing and inspection of the air compressor by the Mid-Atlantic Environmental Equipment (system vendor) service technician on January 23, 2015. The AS system passed commissioning diagnostic tests.

Commissioning was conducted to verify that the components of the AS systems were properly installed and operate as designed. The system P&ID was used to verify that the equipment and piping were installed as designed (Figure 2-6). Additionally, electrical one-line drawings provided by the system integrator were checked to verify process logic and that wiring was completed correctly.

Site-specific commissioning of the AS system was completed to confirm that the equipment and instrumentation were properly prepared and lubricated and that protective covers on rotating equipment were in place. As part of the commissioning process, equipment lockouts, safety valves and/or other pressure relief devices, and site security devices were evaluated. Deficiencies observed during the commissioning phase were corrected to meet operational requirements. Individual component testing and checks were performed to verify the integrity of each component prior to actual operation. Equipment functional performance tests were conducted in accordance with the vendor's recommended procedures after the pre-

commissioning checks were performed successfully. These tests were consistent with the detailed equipment operating procedures included in the vendor's O&M Manual provided in Appendix F.

After the individual equipment and electrical systems were tested, the electrical systems were energized in preparation for testing equipment and control systems. As part of this process, the operating range and proper operation of each controller were verified. The air compressor was set to operate at a discharge pressure of 100 psig by pressurizing the receiver tank to 100 psig and ramping the VFD on the air compressor up or down to maintain this setpoint pressure in the receiver tank. The ability of the compressor to maintain 100 psig at the receiver tank at a flow rate of 250 scfm, the performance specification of the AS system, was verified. Pressures for each manifold zone were adjusted at the pressure regulator installed for each system manifold leg, and controls were tested to verify operating ranges. Where controls provide ON/OFF signals, switches were manually tripped to test control loops. Testing of control systems proceeded from this point to verify operability. Safety shutdown sequences in the control systems were tested to confirm proper interlock functionality. The interlocks and motor starters controlled by interlocks or PLC and other relationships between equipment were tested to determine if the responses were consistent with the design logic.

As part of the commissioning process, the operating range and proper operation of each system control/interlock were evaluated. The controls and fail safes were manually tripped to verify proper functionality. The interlocks and motor starters were tested to verify process logic. The HMI screen for the AS system was monitored for process system conditions. In the main HMI screen, the following data inputs are viewable in real-time and data logged: receiver tank discharge temperature, pressure, total flow, and relative humidity; manifold leg pressure and flow; building temperature; compressor ON/OFF/AUTO; and manifold leg ON/OFF/AUTO. Secondary HMI screens are used for grouping manifold zones and cycle timing setup, and data logging. The air compressor has an integrated HMI/PLC for data inputs of the air compressor and refrigerated air dryer. Following completion of the initial commissioning phase, the system was deemed ready for operational startup testing.

4.2 AS SYSTEM STARTUP TESTING

AS system startup testing was conducted from January 23 through 26, 2015, after completion of the commissioning process and baseline groundwater sampling (Section 3.2). The related health, safety, and emergency response procedures were in place and reviewed before this phase of operation. Before process systems were started, a final check on the alignments and positioning of the motor drives, valves, safety devices, and control set points was conducted.

The objective of the startup testing phase was to confirm that the components of the AS system were operating within design parameters and to flow and pressure balance the six manifold groupings and 122 AS wells. Startup of the AS system was performed sequentially, focusing on each specific manifold zone at a given time, and included comparing observations and test data to design and performance criteria. Startup testing began at Zones E and F on January 23, 2015, proceeded to Zones A and B on January 25, and then Zones C and D on January 26.

The overall startup sequence for the AS process system was as follows:

- Ensure that all valves are in the proper position (including valving at the distribution manifolds);
- Ensure that the electrical disconnects are in energized positions;
- Ensure that the alarm conditions on the control panel are cleared;
- Verify that the condensate treatment system is on line and that fluids were drained;
- Verify that the filters are prepared for operation and that condensate drains and piping are in their correct positions;
- Verify that the solenoid valve programming is set for pre-set pulse intervals and set in the AUTO position and that spare manifold legs are set as “OFF”;
- Turn the selector switch for the rotary screw compressor/air dryer to the AUTO position; and
- Verify operating pressures, flows, and temperatures throughout the system and at the system discharge manifold.

The system was then in automatic operation, and ON/OFF and START/STOP functions of the system were controlled by the PLC. After operation was verified and acceptable at each system location, conditions were inspected at the distribution manifolds. Distribution manifolds were balanced in a sequenced approach, with flow and pressure adjusted and verified for each manifold and then each AS well. The sequence was terminated when the design and equipment performance complied with specifications, and the system was ready for transition into the O&M phase.

Temperature and pressure at the inlet filter, compressor discharge, air dryer, and manifold legs were measured. Total flow from the discharge of the air compressor and manifold legs was verified and passed performance specifications. Observations, sampling, and other performance testing performed during startup ensured that the system was operating as expected.

Due to the size of the AS IM, each manifold zone was individually tested and balanced and then operated in the programmed pulse modes after all zones were balanced. Generally, the injection wells achieved flow and pressure targets within a short time frame. After the testing of the zones was completed, the commissioning and startup of the system were complete.

4.3 AS SYSTEM STARTUP MONITORING

After the systems were running within the expected operating conditions, the components were checked as part of system startup monitoring. Readings for flow and pressure at each AS well and operation flow, pressure, and temperature data at the monitoring points in the systems were collected. Operating data were compared to equipment performance data and evaluated for discrepancies, and process equipment was inspected for proper mechanical operation.

Air sampling was conducted during system startup activities on various days at one location near the Zone A manifold (see Section 3.3). Daily air samples were collected from January 25 through January 29, 2015. Sampling results are summarized in Table 3-4, and complete results are provided in Appendix E. There was one detection of TCE in the air sample collected on January 29, 2015 at a concentration of 0.000038 parts per million by volume (ppmv). This

detection is less than the lowest Occupational Exposure Limit (OEL) for TCE of 10 ppmv. cDCE and VC concentrations were less than detection limits in all of the system startup air samples.

4.4 AS SYSTEM STARTUP O&M

O&M activities were conducted daily during the startup phase to facilitate troubleshooting/ debugging and to confirm that the system was operating as designed. The equipment vendor-provided O&M Manual was followed for detailed direction of system O&M (Appendix F). The vendor's O&M Manual contains instructions recommended by the manufacturer for preventative maintenance and includes part lists, shop drawings, cut sheets, and recommended lubricants.

4.5 AS SYSTEM PROVE-OUT O&M

System prove-out was performed from January 27 through February 17, 2015, to verify that the components of the AS system were operating within the design parameters. All zones were operated under the programmed daily schedule of Zones A and B for 8 hours, then Zones C and D for 8 hours, and then Zones E and F for 8 hours.

4.6 AS SYSTEM FULL-SCALE O&M

The full-scale O&M phase began on February 18, 2015, after the first month of system operation, and will continue for the duration of the project. Full-scale O&M consists of the following:

- Remote monitoring of the system and maintenance performed as needed;
- Weekly upload of datalogging files via the HMI file transfer protocol (FTP) server;
- Quarterly measurements of groundwater elevations and groundwater sampling;
- Monthly site visits to include:
 - Inspection of the system for leakage and excessive vibration, noise, or temperature;
 - Inspection of oil levels and lubrication;
 - Inspection of the condensate treatment system;
 - Inspection of the refrigerated air dryer;
 - Assessment of differential pressure across filtration units and process equipment;
 - Recording system operational data and comparing recorded data to design conditions;

- Performing housekeeping;
- Performing routine maintenance at frequencies specified in the O&M Manual, including:
 - Changing air compressor oil every 4,000 hours; and
 - Replacing filters as needed and/or based on manufacturer's recommended frequencies.
- Balancing the flow and pressure of manifold zones and individual sparging wells

During full-scale operation, the system is monitored remotely, and non-routine maintenance is performed as needed. System evaluations and maintenance activities are conducted to evaluate the operating parameters of the system and to perform the required maintenance activities as identified in the IWP and O&M Manual (Appendix F). The results of a detailed evaluation of system performance and operation will be submitted as part of the OM&M Report to be completed after the first year of full-scale operations.

4.7 AS SYSTEM OPERATIONS, EVALUATIONS, AND MAINTENANCE

In general, routine operations, evaluations, and monitoring consist of observing and adjusting process conditions and checking the AS system for abnormal conditions (e.g., noise, leaks, temperature, and vibration). Routine system observations will be recorded on data sheets and included in the OM&M Report, and activities will be recorded in a field logbook. During each monthly O&M site visit, the following activities will be performed:

- Inspection of the AS system for leakage and excessive vibration, noise, or temperature;
- Inspection of oil levels and lubrication;
- Inspection of the condensate treatment system;
- Inspection of the refrigerated air dryer;
- Assessment of differential pressure across filtration units and process equipment;
- Recording of system operational data and comparing data to design conditions and previous operating data; and
- Performing housekeeping.

Maintenance was and will continue to be executed in a manner that minimizes emergencies or unscheduled shutdowns. Routine maintenance activities include inspecting the air compressor, heat exchanger, condensate treatment system, and air and coalescing filters. More information about routine AS system maintenance activities is provided in Section 6.4 of the IWP.

Currently, each pair of zones (A and B, C and D, and E and F) are operated for 8 hours per day. Cycling may be modified based on system performance. The maximum design flow rate for each AS well is 5 cfm. In April 2014, flow rates for wells in Zones B, C, E, and F were approximately 5 cfm, with flow rates ranging from 4.9 to 6.4 cfm and averaging 5.4 scfm (i.e., within the range of the design point). Flow rates for wells in Zone D were between 6.0 and 6.4 cfm, which is greater than the design flow. Wells in Zone A were initially operating between 2.9 and 3.2, which is less than the design flow, so wells and former boreholes in Zone A were subsequently re-grouted, and design flows were later met. The radius of influence (ROI) was assumed to be 20 feet for each well; however, observations at the site after startup of the system, including air bubbles in surface water in the swale to the west of the system trailer and in the deluge basin holding tank channel, indicate that the ROIs currently exceed 20 feet.

SECTION V

CONCLUSIONS AND RECOMMENDATIONS

Installation of the AS system was completed in accordance with the IWP. The design flow rate for each AS well is approximately 5 scfm. In April 2014, flow rates for wells in Zones B, C, E, and F were approximately 5 scfm, with flow rates ranging from 4.9 to 6.4 scfm and averaging 5.4 scfm (i.e., within the range of the design point). Physical observations at the site indicate that the ROIs are currently greater than the conservative design estimate of 20 feet. Based on the data collected to date, the AS system is operating as designed, and continued optimization is recommended to enhance and maintain operational objectives. Monthly O&M of the AS system is ongoing, and the first quarterly performance monitoring event was conducted in May 2015, 3 months after the beginning of full-scale AS operations. After the first year of full-scale operation, groundwater monitoring results and operational data collected during monthly O&M site visits will be summarized and evaluated in an OM&M Report, and recommendations for future IM activities based on these results will be provided.

SECTION VI

REFERENCES

EG&G, 1994. KSC's Internal Preliminary Assessment of Five Sites at Launch Complex 39A, KSC. For Environmental Management Office and Biomedical Operations and Research Office.

FDEP (Florida Department of Environmental Protection), 2008. DEP Standard Operating Procedure FS 2200, Groundwater Sampling, DEP-SOP-001/01, March.

NASA (National Aeronautics and Space Administration), 2000. Launch Complex 39A, SWMU No. 8 RCRA Facility Investigation Report. Kennedy Space Center, Florida. Revision 0. August.

NASA, 2003. LC39A, SWMU 008, RCRA Facility Investigation Report Addendum. Kennedy Space Center, Florida. Revision 2. September.

NASA, 2011. Sampling and Analysis Plan for the RCRA Corrective Action Program at Kennedy Space Center, Kennedy Space Center, Florida. June.

NASA, 2012. Launch Complex 39A, SWMU 8, Baseline Re-Assessment of Soil and Groundwater Investigation Report. Kennedy Space Center, Florida. Revision 0. December.

NASA, 2013 Launch Complex 39A (LC39A), SWMU 008, High-Concentration and Low-Concentration Plumes Interim Measure Work Plan. Kennedy Space Center, Florida. December.

NASA, 2014a. Site-Specific Health and Safety Plan Addendum for Field Activities at the Launch Complex 39A, Kennedy Space Center, Florida. April.

NASA, 2014b. Implementation Work Plan for Launch Complex 39A, SWMU 008, High-Concentration and Low-Concentration Plumes. Kennedy Space Center, Florida. August.

APPENDIX A

PHOTOGRAPHIC LOG



Viewing West - Preparing to transport spools of 2-inch HDPE from 516S Area to LC39A. Date: 8/19/14



Viewing East - Excavation for Zones E and F pipe rack. Date: 8/20/14



Viewing Northwest - Excavating header trench from Zones E and F cabinet location. Date: 8/20/14



Viewing West - Excavation of header trench across concrete box culvert. Date: 8/22/14



Viewing Northeast - Header trench from Zones E and F cabinet location along Perimeter Road. Date: 8/22/14



Viewing Southeast - Installation of Zones E and F pipe rack. Date: 8/26/14



Viewing Northeast - Header trench with 1,000-ft of 2-in HDPE from Zones E and F along Perimeter Road. Date: 8/26/14



Viewing Northwest - Aerial view of trenches in Zones E and F and along Perimeter Road. Date: 8/28/14



Viewing Southwest - Backfilling Header trench along Perimeter Road. Date: 8/29/14



Viewing Northeast - Marking tape and wire placed in Header trench along Perimeter Road. Date: 8/29/14



Viewing North - Aerial view of trenches in Zones E and F. Date: 9/02/14



Viewing South - Lateral trenches in Zone E. Date: 9/09/14



Viewing Northwest - Aerial view of trenches in Zones A, C, and D. Date: 9/30/14



Viewing East - Excavation of trenches for Zone E laterals west of the concrete flume. Date: 9/30/14



Viewing Southeast - Excavation of trenches in Zone B and mowing Zone B to prepare for trenching. Date: 9/30/14



Viewing Northeast - Preparing to deploy 2-inch HDPE header piping. Date: 10/01/14



Viewing Southeast - Lateral trenches in Zone B. Date: 10/02/14



Viewing Northwest - Excavation of lateral trench in Zone D up the slope of the camera pad. Date: 10/06/14



Viewing Northeast - Excavation of lateral trench in Zone D up the slope of the camera pad. Date: 10/06/14



Viewing Northwest - Excavation of lateral trench in Zone D up the slope of the camera pad. Date: 10/06/14



Viewing Northwest - Excavation of lateral trench in Zone D up the slope of the camera pad. Date: 10/06/14



Viewing South - Deploying and racking 1-inch HDPE lateral piping in Zone D. Date: 10/07/14



Viewing Northwest - Deploying 2-inch HDPE header piping using 4x4 to pull the pipe towards the AS trailer location. Date: 10/09/14



Viewing Northeast - Header trench between the LOX pipes and the utility rack. Date: 10/09/14



Viewing Northwest - Aerial view of trenches in Zones A, B, C, and D. Date: 10/09/14



Viewing North - Aerial view of trenches in Zones E and F. Date: 10/09/14



Viewing Northwest - Backfilled header trench from Zone B to AS trailer with marking tape and wire.
Date: 10/13/14



Viewing West - Backfilling Zone B lateral trenches. Date: 10/14/14



Viewing West - Backfilling Zone B lateral trenches (background) and Zone B pipe rack (foreground). Date: 10/14/14



Viewing Northwest - Backfilled header trench from Zone B pipe rack to AS trailer. Date: 10/14/14



Viewing Northwest - Backfilled Zone B lateral trench with marking tape and wire. Date: 10/15/14



Viewing Northwest - Backfilling of lateral trench in Zone D up the slope of the camera pad. Date: 10/15/14



Viewing Northwest - Backfilling of lateral trenches in Zone D. Date: 10/15/14



Viewing Southeast - Zone D pipe rack with HDPE/brass transitions welded in place. Date: 10/24/14



Viewing Northeast - Backfilling Zone C lateral trench and installation of AS tee. Date: 10/24/14



Viewing Northwest - Pouring and spreading concrete for Zone D pad. Date: 11/03/14



Viewing Southeast - Leveling concrete with a screed board for Zone D pad. Date: 11/03/14



Viewing Northeast - Finishing concrete for Zone D pad. Date: 11/03/14



Viewing Southwest - Installing AS 010 tee. Date: 11/12/14



Viewing Northwest - Road closure detour for installation of header piping. Date: 11/13/14



Viewing Northeast - Mini-excavator removing asphalt and placing in skid steer bucket. Date: 11/13/14



Viewing Northeast - Mini-excavator removing asphalt and placing in skid steer bucket. Date: 11/13/14



Viewing Northeast - Mini-excavator excavating header trench across roadway. Date: 11/13/14



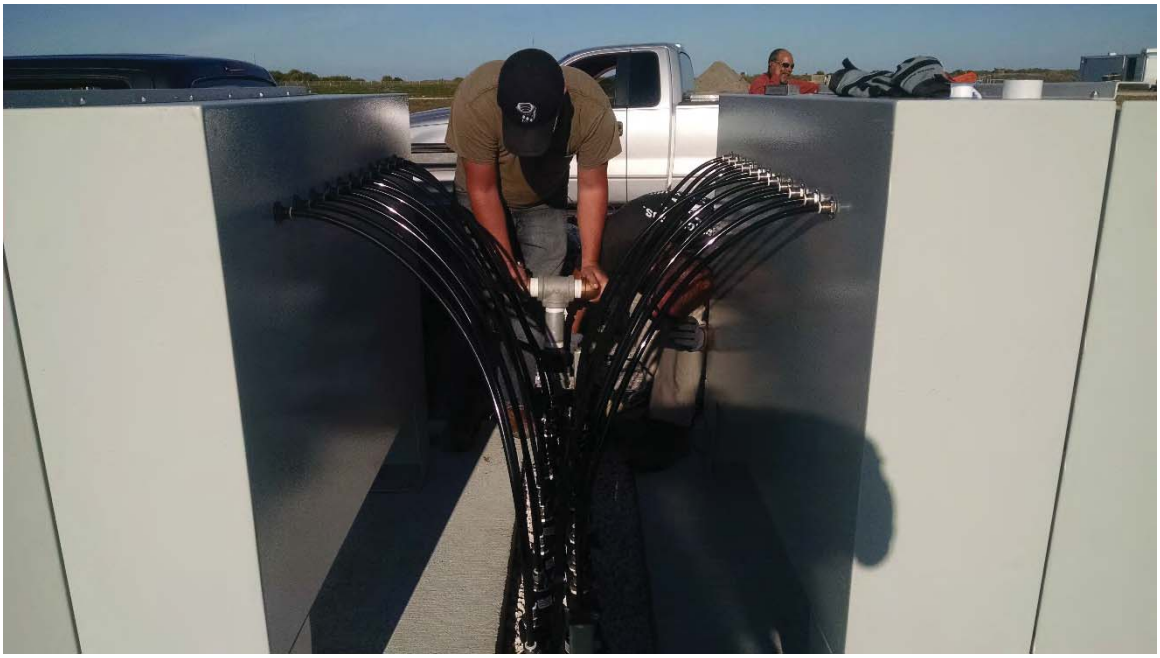
Viewing Northeast - Placing two 2-inch HDPE header pipes in trench across roadway. Date: 11/13/14



Viewing Northeast - Vacuum excavating trench for electric to power AS trailer. Date: 12/17/14



Viewing South - Vacuum excavating trench for electric to power AS trailer. Date: 12/17/14



Viewing Northeast - Installing 2-inch tee on Zone C header piping. Date: 12/17/14



Viewing Northeast - Installing 2-inch tee on Zone C header piping. Date: 12/17/14



Viewing Southeast - View of installed manifold in Zone C cabinet. Date: 12/17/14



Viewing Southeast - Preparing for asphalt placement. Date: 11/17/14



Viewing Southeast - Preparing for asphalt placement. Date: 11/17/14



Viewing Southwest - Preparing for asphalt placement. Date: 11/17/14



Viewing East - Asphalt placed in road crossing. Date: 11/17/14



Viewing Southwest - Two cabinets for Zones E and F mounted on concrete pad. Date: 11/17/14



Viewing Southeast - Asphalt placed in camera pad access road crossing. Date: 11/17/14



Viewing South - Asphalt placed in camera pad road crossing. Date: 11/17/14



Viewing Southwest - Asphalt placed in parking lot crossing. Date: 11/17/14



Viewing Southeast - Asphalt placed in parking lot crossing. Date: 11/17/14



Viewing East - Asphalt placed in parking lot crossing. Date: 11/17/14



Viewing Southeast - Removing LOX pipe trench plates for installation of two AS expansion header 2-inch steel piping. Date: 4/07/15



Viewing East - Replacing LOX pipe trench plates following installation of two AS expansion header 2-inch steel piping. Date: 4/08/15



Viewing Southeast - Removing a portion of steel angle to allow one of two AS expansion header 2-inch steel pipes to pass through perimeter fence. Date: 4/09/15



Viewing Southeast - One of two AS expansion header 2-inch steel pipes capped for future expansion. Date: 4/09/15



Viewing Southeast - One of two AS expansion header 2-inch steel pipes capped for future expansion. Date: 4/09/15



Viewing Southeast - Two AS expansion header 2-inch steel pipes installed for future expansion. Date: 4/09/15



Viewing Southeast - View of AS Zones D (foreground), C (middle), A (background), and B (right). Date: 5/28/15



Viewing West - View of AS trailer from the camera pad. Date: 5/28/15



Viewing Southeast - AS Zone A manifold cabinets. Date: 5/28/15



Viewing Southeast - AS Zone D manifold cabinets. Date: 5/28/15



Viewing Southeast - AS Zone C manifold cabinets. Date: 5/28/15



Viewing South - AS Zones E and F manifold cabinets and flexible hosing and piping. Date: 5/28/15



Viewing East - AS Zones E and F manifold cabinets. Date: 5/28/15



Viewing North - Aerial view of AS Zones E and F. Date: 5/28/15



Viewing Northwest - Aerial view of AS Zones B (left), A (right foreground), C (middle), and D (far right). Date: 5/28/15



Viewing Southeast - AS Zone B manifold cabinets. Date: 5/28/15

APPENDIX B

DAILY STATUS UPDATES

PROVIDED IN ELECTRONIC VERSION ONLY

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	31-Jul
06925			Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite				Onsite
Thomas Niarchos	Surveyor	TN	x				

Visitors:			Onsite				Onsite
Anne Chrest	NASA RPM	AC	x	Stephanie Weiss	Eco Surveyor	SW	x
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	x
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	Call to WC to give him instructions to make sure EW is ok with trenching and then retrieve two 500-foot rolls of 2-inch
7:45	HDPE rolls from FDSA with skid.
8:00	CN onsite LC39A to meet with JM and RO. Provide figures and explanation of air sparging vs. sampling. JM stated
8:10	that hand auger good to go at all times and trenching not affected by no dig (treat as Category 4).
8:15	JM and RO begin locating along perimeter road.
8:30	Call to surveyors, TN on way to finish E and F. Call to JB to brief on progress and no dig statements.
9:00	JM wants order of drilling to determine zones located. JM offsite. Left voicemail for CS. Extending painted trench to
9:10	west.
9:15	TN onsite.
9:20	
9:30	SW onsite to walk area with CN. Good to go.
10:00	
10:15	SW offsite. CN check AS stakes, AS17 missing and AS40 mowed over. Inform TN to replace stakes. Complete
10:45	painting from edge to E and F.
11:00	CN to 516S. WC informed CN that PF stopped by and AC dropped off weather pager.
11:45	
12:00	Lunch.
12:30	CN and WC working on trailer. EW excavating.
13:00	
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	CN instructing EW where to dig for pipe rack.
15:15	
15:30	EW offsite, WC resumes excavation.
16:00	CN and WC offsite.
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 74 -- 89 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	1-Aug
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x		Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS			Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ			Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH			Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB			Alex Murphy	AM	

Subcontractor:			Onsite				Onsite
Eddie Penia	Delivery Driver	EP	x				

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	CN stop for diesel for equipment and gas for trailer generator.
7:45	
8:00	CN at badging station to meet Eddie Penia with 12 spools of 2-inch HDPE. Call to EW onsite at 516S to be ready with
8:15	skid steer to unload HDPE.
8:30	CN escorts EP to site. EW offloads HDPE.
8:45	
9:00	EP offsite. EW on mini excavator. CN loading truck with tools and supplies to erect unistrut rack for HDPE.
9:10	
9:15	
9:20	
9:30	
10:00	WC onsite assisting CN erect rack.
10:30	
10:45	
11:30	CN and WC hand digging near conex box to locate existing HDPE and electrical conduit.
12:00	EW completes trenching. Call from CH to discuss parts and schedule.
12:15	
12:30	Lunch.
13:00	WC assisting EW start to erect tees. CN call to JM for clarification of digging on no dig days at LC39A. CN to JM's
13:15	office for signature on permit.
13:30	
13:40	
14:00	
14:25	Phase 2. All in trailer erecting parts. Heavy rains.
14:30	
14:40	
14:45	
15:00	
15:15	
15:45	MJ emails wanting run times on CCB and 516S compressors.
16:00	EW and WC offsite. CN retrieving run times and emails to MJ.
16:30	CN offsite.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 74 -- 91 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	14-Aug
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN to 516S.
7:45	CN and EW onsite 516S. Tailgate. RL and WC at LC34 cleaning stripper today.
8:00	EW erecting tees for LC39A. CN to LC39A to markup E&S figure and deliver dig permit to CS. Call to Chris Pike. Met
8:15	with Todd Ziegler of SpaceX who okayed steel across concrete flume for Area E AS wells on southern side of flume.
8:30	
8:45	
9:00	
9:10	
9:15	
9:20	
9:30	
10:00	CN returns to 516S to email photos to Chris Pike and send email to Todd Ziegler to request permission to escort
10:30	deliveries of equipment and materials.
10:45	
11:15	
12:00	Lunch.
12:30	Left voicemail for MD and sent email regarding electrical trenches at LC39A.
12:45	
13:00	
13:15	
13:30	
13:40	
14:00	Call from MD, CN to take care of SpaceX digging in Area 31 and let them know it won't happen again. Immediately left
14:25	voicemail on Todd Ziegler's mobile to not have employees in area, look at map, that's why it was provided and I'll have
14:30	excavators out there Monday.
14:40	
14:45	
15:00	
15:15	Heavy rains, no Phase II on pager but obvious lightning.
15:35	EW off site.
16:00	
16:30	CN offsite.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

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Temperature Range: 73 -- 92 ^{0} F

Weather Conditions: Thunderstorms

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	15-Aug
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite
Chris Angel	SpaceX	CA				
Travis Helton	SpaceX	TH	x			
Jose Espinoza	SpaceX	JE				

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for gas for generator.
7:45	CN, RL, WC, EW onsite. Tailgate.
8:00	RL gathering supplies to wash filters at CCB. WC gathering tools and supplies to install magnetic tape and wire in
8:15	516S trenches. EW resumes erecting tees for LC39A. CN printing figures to discuss Area 31 with SpaceX employees
8:30	(CA, TH, and JE).
8:45	
9:00	RL on mini excavator and WC on skid backfilling trenches and placing magnetic tape and wire. CN offsite to LC39A
9:10	and left voicemail for Todd Ziegler. Met with TH who introduced CN to engineers (Chris Walden, Lauren Kruger, and
9:15	Peter?). Gave figures of all contaminated areas to avoid recurrence. JE and CA not on site.
9:20	
9:30	CN return to 516S and check on backfilling progress.
10:00	Call from Todd Ziegler, very apologetic and will provide anything needed to rectify.
10:30	Call to MD to brief him on morning.
11:00	
11:15	
12:00	Lunch. Phase II.
12:23	Phase II terminated.
12:30	All resume.
13:00	
13:15	
13:30	
13:45	Phase II. RL offsite for diesel. WC unpacking LC39A boxes to organize parts.
14:00	
14:15	RL returns. Tefloning parts for LC39A legs.
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	RL offsite.
15:50	EW offsite.
16:00	CN and WC offsite.
16:45	
17:00	
17:15	
17:20	
17:30	End of day.
18:00	

Comments:

Temperature Range: 74 -- 88 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	18-Aug
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN		Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite
Todd Ziegler	SpaceX	TZ				

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop at Home Depot for supplies and gas station for gas for truck and generators and diesel for mini and skid.
7:45	
8:00	CN, RL, WC, and EW onsite 516S. Tailgate.
8:15	WC on skid and RL on mini resume backfilling trenches. EW and CN setup parts for EW to erect legs for LC39A. CN
8:30	to Hazardous Storage Area for see how many personnel support it for MJ and stop by Dig Police for CCB Hot Spot
8:45	permit signature but nobody there.
9:00	
9:10	
9:15	
9:20	
9:30	All to LC39A for SpaceX safety training at 10:00. Trainer did not show, reschedule.
10:00	
10:30	
10:45	All and MD into LC39A to look at Area 31.
11:30	Return to 516S. Lunch.
12:00	RL and WC resume backfilling and grading. EW resumes erecting parts for LC39A. CN loads 500-gallon poly tank
12:15	and delivers to CS at LC39A.
12:45	
13:00	CN making calls to Vermeer and AWMS regarding vacuum truck and rolloffs for Area 31. Emails to Todd Ziegler
13:15	regarding roll off boxes.
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	All offsite. CN call to MD regarding Area 31.
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 76 -- 91 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	19-Aug
06925			Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	x
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for diesel for mini and skid. RL and WC onsite. SV onsite to transfer 300-gallon tank to LC34 with IDW. WC
7:45	loads tank with skid.
8:00	RL and SV to LC34. EW and CN onsite. Tailgate - moving day - demobilization of field trailer from 516S.
8:15	CN, WC, and EW making multiple trips to move 2-inch HDPE pipe tools and equipment and trailer to LC39A.
8:30	
8:45	
9:00	
9:10	
9:15	
9:20	
9:30	
10:00	
10:30	
10:45	
11:15	
11:45	
12:15	
12:45	Lunch.
13:00	
13:15	WC and EW transferring mini to LC39A and returning for office trailer.
13:30	CN to LC39A for meeting with SpaceX and MD regarding Area 31 (and 7 and 8) at 2:00.
13:40	
14:00	Meet with SpaceX with MD to discuss Area 31 and Area 7/8 for excavating.
14:25	
14:30	
14:40	
14:45	
15:00	CN to LC39A. WC offsite. CN and EW setup trailer and fuel mini.
15:15	
15:30	
16:00	CN and EW offsite.
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 76 -- 93 ^{0} F

Weather Conditions: Mostly sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	20-Aug
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Steve Ruffing	SR	x	Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for gas for generator and ice.
7:45	
8:00	CN and EW onsite. Tailgate. Print figures for EW and review trenching.
8:15	
8:30	WC onsite briefly for tools and materials. WC and RL plumbing into building at LC34 today. CN and EW layout E and
8:45	F cabinet locations.
9:00	EW on mini begins trenching from E/F to northwest to road crossing. CN marking trench for western half of E/F and
9:10	refreshing utility markings.
9:15	
9:20	
9:30	
10:00	
10:30	
11:00	CN hand excavating water line crossing north of AS122. Call to Jim at Barnes Supply for 1-inch HDPE estimated time
11:15	of arrival. Jim calling back.
11:45	
12:30	EW resumes trenching.
12:45	
13:00	
13:15	
13:30	Call with CH regarding inventory and parts.
13:40	
14:00	Call with SR regarding LC34 schedule and progress.
14:25	
14:30	Re-paint trench for EW and remove flags.
14:40	
14:45	
15:00	CN offsite to LC34 to meet SR and check on RL and WC progress.
15:15	
15:30	
16:00	EW offsite LC39A.
16:30	CN, SR, RL and WC offsite LC34.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 75 -- 93 ^{0} F

Weather Conditions: Sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	21-Aug
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM	x	Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	x	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN to LC34.
7:45	CN, WC, and RL at LC34. Discuss punchlist of items: compress dumpster contents, pump water from dirt box and re-
8:00	cover, consolidate remaining concrete. EW onsite LC39A, resumes trenching.
8:15	
8:30	
8:45	
9:00	CN onsite LC39A, hand digging utility crossing.
9:10	
9:15	
9:20	
9:30	
10:00	CN meets with JM and RO for CCB permit signature and discuss Area 7/8 excavation. Assist CS offload second 500-
10:30	gallon poly tank for IDW.
10:45	
11:30	
12:00	Lunch.
12:30	Stop at 516S for pump and hoses.
12:45	
13:00	EW resumes trenching. CN exchanging emails with Chris Angel to setup SpaceX training.
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	CN and EW offsite.
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

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Temperature Range: 77 -- 92 ^{0} F	
Weather Conditions: Rain	Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	22-Aug
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for gas and diesel and ice.
7:45	
8:00	CN and EW onsite. Tailgate.
8:15	EW resumes trenching. CN starting trailer and calling RL or SV to arrange drop of HDPE fittings at Tiki Shack.
8:30	
8:45	
9:00	
9:10	
9:15	CN hand digging to clear utility. CS setting up Trimble GeoHX to stake Areas 31, 32, 33, 7 and 8.
9:20	
9:30	
10:00	CN email to CH to notify of receipt of materials and order 150 90-degree shark bites.
10:30	
10:45	
11:30	CN hand digging to clear box culvert and utility.
12:00	Lunch.
12:30	EW relocate mini to north side of concrete flume where 36, 87, 92, and 93 will cross. CN spotting for utilities as EW
12:45	cuts trench through Area E west of swale.
13:00	
13:15	
13:30	
13:40	
14:00	
14:15	CN timesheet approvals. Call to Todd Freese to see if construction and demolition debris can be hauled to Schwartz,
14:30	not sure. Left voicemail for Rodney Brown.
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	All offsite.
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 75 -- 92 ^{0} F

Weather Conditions: Mostly sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	25-Aug
06925			Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN		Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for gas, diesel, and ice.
7:45	
8:00	CN, EW, RL, and WC onsite LC39A. Tailgate.
8:15	EW resumes trenching Areas E/F west of swale. CN, RL, and WC setup to lay 2-inch HDPE from E/F along perimeter
8:30	road to rear pad access road, approximately 1000 feet. 2nd roll kinked, roll removed and replaced with another.
8:45	
9:00	
9:10	
9:15	
9:20	
9:30	
10:00	
10:30	
10:45	
11:15	
11:45	
12:30	Lunch.
12:45	
13:00	All resume. CN hand digging to clear utility for EW.
13:15	
13:30	Laying 2nd roll of 500 feet.
13:40	
14:00	
14:25	
14:30	Switch from side deployment from skid to using spool built for 1-inch and pulling pipe with 4x4, much better.
14:40	
14:45	
15:00	
15:15	
15:30	3rd roll laid, RL and WC welding coupler and CN housekeeping.
16:00	
16:15	All offsite.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 78 -- 88 ^{0} F

Weather Conditions: Mostly sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	26-Aug
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	CN stops at Walmart for water, drive by West Marine (not open until 9), Home Depot for unistrut and concrete and gas
7:15	station for diesel.
7:30	
7:45	
8:00	CN, WC, EW onsite. WC greasing skid. EW greasing mini. CN taking notes.
8:15	RL onsite. Tailgate.
8:30	CN, RL, WC set up to lay 4th roll of 2-inch HDPE.
8:45	
9:00	RL and WC laying 2-inch. CN hand digging for EW to clear utilities.
9:10	
9:15	
9:20	
9:45	RL and WC weld coupler into 2-inch.
10:00	RL and WC assisting CN.
10:30	RL and WC setting up to install unistrut pipe rack at Area E/F.
10:45	
11:15	
12:00	Lunch.
12:30	All resume. RL and WC place 2-inch in trench and hand digging for EW to clear utilities.
12:45	
13:00	
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	All offsite. CN to Travis Supply and West Marine for parts and supplies.
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	End of day.
18:00	

Comments:

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Temperature Range: 75 -- 87 ^{0} F	
Weather Conditions: Rain	Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	27-Aug
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN at Advanced Auto for parts. Call to EW to resume trenching western half of Area E/F. RL and WC at LC34
7:45	plumbing building and replacing fencing today. CN to Ace Hardware, West Marine, Walmart, Harbor Freight, Home
8:00	Depot, and Ace Hardware again for parts and tools.
8:15	
8:30	
8:45	
9:00	
9:10	
9:15	
9:20	
9:30	
10:00	
10:30	
10:45	
11:15	
11:45	
12:15	
12:45	
13:00	CN onsite LC39A. Call to WC to leave LC34 and meet 1-inch HDPE delivery at KSC Badging Station to escort to
13:15	LC39A.
13:30	
13:40	
14:00	Receive 33,000 linear feet 1-inch HDPE. WC off loading with skid.
14:25	
14:30	
14:40	
14:45	CN escort driver offsite.
15:00	
15:15	CN returns.
15:30	
16:00	All offsite.
16:30	End of Day.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

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Temperature Range: 74 -- 86 ^{0} F	
Weather Conditions: Rain	Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	28-Aug
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for gas for trailer generator.
7:45	
8:00	CN, WC, EW onsite. Tailgate.
8:15	EW on mini resumes excavating trenches in western half of Area E/F.
8:30	
8:45	
9:00	CN and WC mark trench lines in eastern half of Area E/F.
9:10	
9:15	
9:20	
9:30	CN and WC repainting utility markings in Area A-D.
10:00	
10:30	
10:45	
11:15	
12:00	Lunch.
12:15	
12:30	EW begins trenching in southern end of eastern half of Area E/F. WC spotting and hand excavating for EW to clear
13:00	utilities. Scan and email CCB Hot Spot dig permit to MJ. Call to MS regarding POL excavation, next Wednesday and
13:15	Thursday. Call from Jose Espinoza of SpaceX electric to schedule meeting for tomorrow.
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	EW offsite.
16:30	CN offsite to FedEx.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 73 -- 88 ^{0} F

Weather Conditions: Mostly sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	29-Aug
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite
Jose Espinoza	SpaceX	JE	x			

Visitors:			Onsite			Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE
Jeff McDowell	KSC Dig Police	JM	x	Philip Falk	NASA Safety	PF
Ryan Ostarly	KSC Dig Police	RO	x	Sean O'Brien	CCAFS Dig Police	SO

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for diesel and ice.
7:45	
8:00	CN, WC, and EW onsite. Tailgate. RL at LC34 with SV.
8:15	EW on mini resuming trenching in eastern half of E/F, WC hand excavating for EW to clear utility. CN call to JE to
8:20	meet at Building 1553 to discuss electric hookup.
8:30	CN meet with JE, switch spare 100 amp to 150 amp. We buy materials, they'll install. Could lay on ground due to
8:40	being temporary. CH to get him drawings for review.
9:00	Call to CH to brief on meeting with JE.
9:15	
9:20	
9:30	JM and RO onsite to discuss dig permit areas not located. Call a couple days before needed. WC on 4x4 putting
9:40	tension on 2-inch lines and CN checking to make sure other end doesn't move.
9:45	JM and RO offsite. WC on skid backfilling trenches 3/4 full from stop sign to northeast towards Areas E/F.
10:00	CN to trailer to work on email responses.
10:15	Heavy rains.
10:45	Rain subsides.
11:00	RL onsite preparing to lay marking tape and wire.
12:00	Lunch.
12:30	All resume.
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	RL erecting HDPE/brass transitions with brass bushings and 90-degree shark bites for 516S.
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 74 -- 90 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	2-Sep
06925			Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for diesel and ice.
7:45	
8:00	CN and EW onsite. Tailgate.
8:15	EW resumes excavating eastern half of E/F. CN call to CS to pick up 500-gallon poly tank for CCB.
8:30	
8:45	
9:00	Call to Freese for estimated time of arrival for roll off box at LC34. Call to RL at LC34.
9:10	
9:15	
9:20	
9:30	
10:00	
10:30	
10:45	Call from Kevin of RTD asking if we could fuse 2-inch at CCB. Will loan them hot plate when time comes. Also asked
11:15	Kevin about them moving their laydown area to make room for the 516S manifold trailer. Will do by the end of the
11:30	WC onsite.
12:00	Lunch. Empty roll off box dropped at LC34 for concrete. Debris roll off box taken to Schwartz.
12:30	RL loading concrete into roll off box with Kubota at LC34. EW resumes excavating. CN and WC relocate trailer.
13:00	WC transferring skid to Area 7 excavation.
13:15	
13:30	
13:45	EW finishing E/F trenching. WC loading mini to transfer to Area 7. CN meeting roll off box truck to drop roll off box at
13:50	Area 7.
14:00	Roll off box offsite to get 15 cubic yard roll off box for MS at 5th Street.
14:30	EW tefloning parts. CN and WC load parts and tools to weld transitions at 516S (22).
14:40	
14:45	
15:00	EW offsite to meet roll off box at 5th Street. CN and WC offsite to weld HDPE/brass transitions at 516S.
15:15	
15:30	
16:00	All offsite. WC to LC34 to assist RL loading poly tank and CN to FedEx.
16:30	
16:45	
17:00	End of day.
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 73 -- 88 ^{0} F

Weather Conditions: Mostly sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	3-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS	x	Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop at LC34 for trailer and 300-gallon poly tank and stick of 3-inch PVC.
7:45	RL onsite LC34 assisting CN and housekeeping. WC onsite LC39A tefloning parts.
8:00	
8:15	
8:30	CN and RL to LC39A.
8:45	CN and RL onsite LC39A. Tailgate.
9:00	
9:10	
9:15	Gather tools to excavate Area 7 and half of Area 8.
9:20	
9:30	RL in mini excavating Area 8, transferring bucket loads to bucket of skid, WC on skid dumping into roll off box, CN
10:00	hand shoveling.
10:30	
10:45	Area 8 complete, proceed to excavate Area 7 in same manner.
11:15	
11:45	
12:15	Area 7 complete.
12:30	Lunch.
13:00	CS onsite for 500-gallon poly tank, RL and WC assist.
13:15	RL and CN tarping roll off box. WC transporting mini, then skid, back to air sparge area.
13:30	
13:40	
14:00	
14:15	CN marking paths for trenches and RL and WC repainting utilities for Areas C and D.
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	All offsite. CN to Lowe's and Walmart for tools and supplies.
16:30	
16:45	
17:00	Call from MD, CN briefs MD on schedule and Area 7/8 excavation.
17:15	
17:20	
17:30	Resume purchasing tools and supplies
18:30	End of day.

Comments:

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Temperature Range: 72 -- 88 ^{0} F	
Weather Conditions: Rain	Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	4-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for gas and ice.
7:45	
8:00	CN and WC onsite LC39A. CN and WC construct step for trailer.
8:15	
8:30	
8:45	
9:00	RL onsite assisting WC. CN escorts roll off box truck to Area 7/8 to transport full roll off box to laydown with three
9:10	boxes from Areas 14/15.
9:15	Roll off box truck offsite.
9:20	
9:30	CN, RL, and WC resume marking trench paths and repainting utilities for Area B and Area D on camera pad.
10:00	
10:30	
10:45	
11:15	
12:00	Lunch.
12:30	All set up to lay 1-inch pipe in Areas E/F.
12:45	
13:00	All begin laying 1-inch.
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	CN following up on emails.
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	RL and WC offsite.
16:30	CN offsite.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 72 -- 87 ^{0} F

Weather Conditions: Mostly cloudy

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	5-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	x

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	Call to WC to watch for Watkins for fuel.
7:45	WC and RL onsite LC39A. Setup to resume laying 1-inch HDPE in Areas E/F.
8:00	CN to Harbor Freight for tools and supplies.
8:15	
8:30	
8:45	
9:00	CN stop for ice.
9:10	
9:15	CN at 5th Street site. Pipe mastic and PACM (presumed asbestos-containing material) pipe discussion with AM.
9:20	
9:30	CN to CCF to measure 1-inch steel pipe. Look for RTD ACM personnel - none in sight. Call to MS.
10:00	CN onsite LC39A, check on WC and RL. Tailgate.
10:30	CN takes photos of Area 42, stakes SS and TT for CP and JB and emails to them.
10:45	
11:15	
12:00	Lunch.
12:30	RL offsite. CN and WC erecting parts.
12:45	
13:00	
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	All offsite.
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 71 -- 88 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	8-Sep
06925			Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN		Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice
7:45	
8:00	CN, WC, RL, EW onsite. Tailgate. 4.5 inches of rain over the weekend.
8:15	EW on mini resumes trenching main trench from west side of road crossing to northwest along top of camera pad.
8:30	CN, RL, WC look over amount of water in trenches. Calls to CP and voicemail for MD.
8:45	
9:00	
9:10	
9:15	EW call, struck and severed small unmarked wire near headwall. Call to JM of dig police.
9:45	RL and WC offsite to FDSA for 3-inch pump and hosing. JM and RO onsite. Marked line and appeared to be old. JM
9:50	asked CN to wrap with electric tape and bury.
10:00	JM and RO offsite. Call from MD. Discussed water dicharge options but will allow to recede first.
10:30	
10:45	RL and WC return. Unload trailer.
11:00	RL and WC erecting tees.
12:00	Lunch.
12:30	WC offsite to trim shrubbery at south side of Hazardous Waste Storage Area at FDSA (turning brown) and reconnect
12:45	sprinkler system. CN and RL re-painting utilities in D, C, and A areas and trench paths in northern half of A.
13:00	
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	RL hand digging for EW to clear utilities.
14:40	
14:45	
15:00	WC returns, erecting tees.
15:15	
15:30	
16:00	All offsite. CN to FDSA to set sprinkler timer.
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 71 -- 88 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	9-Sep
06925			Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	x

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	CN, EW, AM onsite. Tailgate. RL and WC assisting SV connecting 516S trailer.
8:00	EW on mini trenching in Area D. AM hand digging to clear utilities.
8:15	
8:30	
8:45	
9:00	Watkins onsite.
9:10	
9:15	
9:20	
9:30	
10:00	
10:30	
10:45	
11:15	
12:00	Lunch. Phase II.
12:30	EW & AM offsite to 5th Street site to load roll off boxes.
12:45	
13:00	RL and WC onsite for tools and supplies.
13:10	Phase II terminated.
13:30	RL and WC offsite.
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:45	Call from MD to discuss rainwater infiltration in ditch (10 inches), schedule, sample results, dioxins.
16:00	
16:15	CN offsite.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 71 -- 88 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	10-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	x

Subcontractor:			Onsite			Onsite
Todd Ziegler						

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	x	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM	x	Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	x	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	CN, EW, AM and WC onsite. Tailgate. WC offsite to 516S to resume plumbing trailer with RL.
8:00	EW on mini resumes trenching. AM spotting and hand excavating at utility crossings.
8:15	CN housekeeping.
8:30	
8:45	
9:00	
9:10	
9:15	
9:20	
9:30	MD onsite. Tour with CN.
9:40	AM called to inform CN of communication line strike. CN call to JM and RO.
10:30	JM and RO onsite to look at communication line. JM called Todd Ziegler (TZ) to have SpaceX determine if they need
10:45	
11:15	MD offsite. Needs excavation areas 8, 27, 38, and 43 staked.
11:20	SpaceX, Tom Dessert onsite. Don't need communication line. He'll email TZ.
12:00	Lunch.
12:30	EW and AM resume trenching. CN exchanging emails with CH regarding trailer layout.
13:00	
13:15	
13:30	Calls with CH regarding trailer layout.
13:40	
14:00	
14:25	
14:30	CN offsite to 516S to discuss trailer layout with SV. Then to CCB for stakes from CS. IM and text with TZ to meet at
14:40	LC39A
14:45	
15:00	
15:15	
15:30	CN returns to LC39A.
16:00	EW and AM offsite.
16:15	CN left voicemail and sent text to TZ to see if available to meet.
16:30	No reply. CN offsite.
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 73 -- 88 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	11-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	x

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	WC onsite changing oil and filter on trailer generator.
8:00	CN and EW onsite. CN assisting WC, EW greasing mini excavator.
8:15	RL onsite, assisting WC. CN prepping to stake areas 8, 19, 27, 38, 43, and SS and TT by 42.
8:30	AM onsite, hand digging to clear utilities for EW in mini trenching Area D. CN placing stakes. RL and WC offsite to
8:45	516S to install orange stakes and remove fiberglass poles.
9:00	
9:10	
9:15	
9:20	
9:30	
10:00	
10:30	AM texts photo of 6 cables/1 severed that was marked.
10:45	
11:15	
12:00	Lunch.
12:15	
12:30	Missed text from Todd Ziegler (TZ) of SpaceX. Returned text to let him know I was onsite.
13:00	
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	Meet with TZ, discuss Franklin Excavating's swamp mat removal and mess left behind, work with "Sweet" to phase
16:00	trenches to allow access to LOX pipes, and showed him proposed trailer location. He will get back to me whether
16:15	location is okay.
16:30	CN offsite.
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 73 -- 87 ^{0} F

Weather Conditions: Mostly sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	12-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	x

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	CN, RL, AM, WC, and EW onsite. Tailgate.
8:00	EW on mini resumes trenching in Area D with AM spotting for utility crossings. RL and WC prepare to resume laying 1-
8:15	inch HDPE in Areas E and F.
8:30	RL and WC laying 1-inch HDPE.
8:45	
9:00	
9:10	
9:15	
9:20	
9:30	
10:00	
10:30	
10:45	
11:15	
11:45	
12:00	Lunch.
12:30	All resume.
13:00	
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	Check on crew progress.
15:30	
16:00	RL, WC, EW, and AM offsite.
16:30	
16:45	
17:00	CN offsite. Security did not have latest access email for September. CN back to trailer to print hard copies for
17:15	security.
17:20	
17:30	CN offsite.
18:00	

Comments:

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Temperature Range: 77 -- 88 ^{0} F	
Weather Conditions: Thunderstorms	Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	15-Sep
06925			Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS	x	Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite
Mike Villeneuve	JH Villeneuve Paving	MW	x			

Visitors:			Onsite			Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice. Call to MV to schedule meeting at LC34.
7:45	
8:00	CN, CS, EW, RL, and WC onsite LC39A. Tailgate.
8:15	
8:30	EW on mini excavating trenches in Area D. CS spotting and hand excavating utilities. RL and WC laying 1-inch
8:45	HDPE in Areas E and F. CN printing LC34 asphalt scope of work.
9:00	CN offsite to LC34.
9:10	
9:15	
9:20	
9:30	
10:00	CN meet with MV at LC34 and gave him scope of work.
10:30	CN to LC39A. Left voicemail for Sandy D'Alessandris regarding LC34 paving.
11:00	CN onsite LC39A. Check on EW and CS.
11:30	CN check on RL and WC.
12:00	Lunch.
12:30	All resume.
12:45	
13:00	
13:15	
13:30	RL reports reel is coming apart due to rotting wood. CN inspects.
13:40	
14:00	CN, RL, and WC looking for replacement reel.
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	CS and EW offsite. CN, RL, and WC return.
16:30	All offsite.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

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Temperature Range: 72 -- 88 ^{0} F	
Weather Conditions: Rain	Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	16-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS	x	Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	
8:00	CN, CS, EW, RL and WC onsite. Tailgate.
8:15	EW resume trenching in Area D with CS spotting. RL weed eating marked trench path and utility crossings with CN
8:30	and WC repainting path and utilities.
8:45	
9:00	
9:10	
9:15	
9:20	
9:30	
10:00	
10:30	CN, RL, and WC repairing reel for 1-inch HDPE deployment.
10:45	
11:30	Lunch (CN, RL, and WC).
12:00	Lunch (EW and CS). RL and WC resume laying 1-inch HDPE in Areas E and F. CN email MS and JB to respond to
12:15	CS's messages regarding sampling dioxin at LC39A tomorrow.
12:45	
13:00	
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	CN assisting RL and WC pull 1-inch pipe in Areas E and F.
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	CS, RL, WC, and EW offsite.
16:30	
16:45	
17:00	CN offsite.
17:15	
17:20	
17:30	
18:00	

Comments:

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Temperature Range: 75 -- 89 ^{0} F

Weather Conditions: Thunderstorms



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	17-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS	x	Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	
8:00	CN, EW, and WC onsite. Tailgate. RL at LC34 with SV today.
8:15	
8:30	EW on mini resumes excavating Area D north of camera pad with WC spotting. CN gathering tools to assist RTD with
8:40	2-inch HDPE welds at CCB.
8:45	CN offsite to CCB. Returned for 2 couplers.
9:10	
9:15	CS onsite collecting dioxin samples.
9:20	
9:30	
10:00	
10:30	CN returns to site.
10:45	
11:15	
12:00	Lunch.
12:30	CS offsite to meet sample pickup.
12:45	
13:00	EW and WC resume. CN calls to RL and CS. RL will continue working at LC34 today and CS will go to office.
13:15	
13:30	
13:40	
14:00	All offsite.
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

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Temperature Range: 72 -- 86 ^{0} F	
Weather Conditions: Thunderstorms	Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	18-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS	x	Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	
8:00	CN, RL, EW, WC, and CS onsite. Tailgate.
8:15	EW on mini trenching Area D across top of camera pad. CS, RL, and WC laying 1-inch HDPE in Areas E and F to
8:30	extend runs greater than 500-feet and welding couplers. CN call with Sandy D'Alessandris regarding asphalt
8:45	company, Driveway Maintenance email and JH Villeneuve quote received last night for LC34. CN left voicemail for MV
9:00	at JH Villeneuve. Call with CH regarding LC34 asphalt and LC39A parts. CN call to Barnes Supply to order 120 1-
9:10	inch couplers (should have been delivered with 1-inch pipe - was not).
9:15	
9:20	
9:30	
10:00	
10:30	
10:45	
11:15	
12:00	Lunch.
12:30	All resume.
12:45	
13:00	
13:15	
13:30	1-inch pipe install complete, WC on skid placing 2/3rds backfill in Areas E and F trenches. EW completes Area D
13:40	trenching except road crossings and steep grades over camera pad. EW transporting mini to Areas E and F to level
14:00	2/3rds backfill for tape and wire placement. CS and RL welding 1-inch couplers onto tee assemblies.
14:15	CN call to Barnes to inform them last order of couplers not received.
14:30	
14:40	
14:50	
15:00	
15:15	
15:30	CS and RL pump water from trench C swale crossing for EW to hold pipes on trench bottom with mini and WC push
16:00	backfill with skid.
16:15	CS, RL, WC, and EW offsite. CN remained while NEFF serviced mini.
16:45	
17:00	
17:15	
17:20	
17:30	All offsite.
18:00	

Comments:

Temperature Range: 73 -- 88 ^{0} F

Weather Conditions: Mostly sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	19-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS	x	Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	
8:00	CN, WC, EW, and CS onsite. Tailgate.
8:15	WC and CS loading parts and tools in 4x4 to install tees in Areas E and F. EW on mini leveling 2/3rds backfill in Areas
8:30	E and F trenches for tape and wire placement. WC on skid placing 2/3rds backfill. CN checking parts inventory and
8:45	investigating missing shipments. Calls/emails with CH and visit to SpaceX receiving. One shipment somewhere in
9:00	SpaceX system. Others shipped to G&L Storage. Most received, one at 516S and another at G&L Storage. CN also
9:10	exchanging calls with Eddie at Barnes Supply in search of missing shipment of 1- and 2-inch couplings. Ultimately
9:15	sent back to shipper to be re-shipped.
9:20	
9:30	
10:00	
10:30	
10:45	
11:15	
11:45	
12:00	Lunch.
12:30	EW, RL, and CS resume. WC erecting HDPE and brass transitions with bushings and shark bits. Ran out of shark
13:00	bites and began assembling tees.
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	RL and CS complete installing 32 tees. Begin housekeeping.
16:00	All offsite.
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 71 -- 85 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	22-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	x
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	x

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop at Walmart for supplies. Call from EW, at NEFF picking up saw, with prices for backhoe for LC34. Call to
7:40	WC to begin marking asphalt for 6 road crossing sawcuts.
7:45	RL, WC, and AM onsite and begin marking sawcuts.
8:15	EW onsite. All offloading saw.
8:30	EW on mini excavating trenches in Area C with AM spotting.
8:45	
9:00	WC and RL sawcutting. CN stop at G&L to pick up shipment.
9:10	
9:15	
9:20	
9:30	CN stop for ice and check on shrubbery at FDSA. 3 of 10 appear dead, 2 of those 3 run over by Hazardous Storage
9:45	4x4. Discussed with Barry Hamilton of FDSA.
10:00	CN onsite LC39A. Stop at SpaceX receiving to inform them to look for shipment of ours that they received.
10:45	
11:15	
12:00	Lunch.
12:30	All resume.
12:45	
13:00	
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	Phase II. RL and WC complete sawcuts. EW loads saw for return.
15:15	
15:30	EW offsite to return saw. RL offsite to gather supplies for HMF sampling tomorrow. AM tefloning and WC erecting
16:00	
16:15	All offsite.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 71 -- 87 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	23-Sep
06925			Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	x	Ronnie Linton	RL	
Field Operations Coordinator:	Chuck Sorden	CS		Wayne Crisafulli	WC	x
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	x
Project Manager:	Mark Jonnet	MJ		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Alex Murphy	AM	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	
8:00	CN, WC, and EW onsite LC39A. Tailgate. RL assisting SV sampling HMF today and AM assisting JR sampling POL
8:10	today.
8:15	Rains begin. EW tefloning and WC erecting tees.
8:45	
9:00	Watkins onsite.
9:10	
9:15	
9:20	Phase II.
9:35	Phase II terminated.
10:00	
10:30	EW on mini trenching Area C with WC spotting. CN sent email regarding inventory to CH and asked if flow meters
10:45	were on order.
11:15	
12:00	Lunch.
12:30	All resume.
12:45	Phase II. WC and EW tefloning and erecting tees.
13:00	Phase II terminated.
13:15	
13:33	Phase II. Heavy rains.
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	CN offsite to Staples to drop notes for scanning.
15:30	
16:00	EW and WC offsite.
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

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Temperature Range: 71 -- 84 ^{0} F	
Weather Conditions: Thunderstorms	Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	24-Sep
06925			Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN		Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	
7:45	
8:00	RL, EW, WC and AM onsite. EW excavating in Area C with AM as spotter. RL and WC tefloning and erecting parts for
8:15	air sparge system.
8:20	
8:30	
8:40	
9:00	
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	
10:15	
10:45	
11:00	
12:00	RL offsite to assist SV.
12:30	EW and AM assist WC with tefloning and erecting parts for air sparge system.
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	All off-site
16:30	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 71 -- 82 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	25-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	
7:45	
8:00	RL, EW, WC & AM onsite. CN to Home Depot for supplies.
8:15	
8:20	EW resumes excavating Area C with AM as spotter. RL and WC use 3-inch pump to hydro excavate Areas of trench in
8:30	Area D left due to congested utilities.
8:40	
9:00	
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	
10:30	
11:00	
11:30	CN arrives onsite with supplies. RL, WC, and CN unload supplies.
12:00	Lunch
12:30	EW and AM resume excavating. RL and WC resume hydro excavating.
13:15	
13:30	
13:40	
14:00	WC and RL tefloning and erecting parts (too much water in trenches from rains to lay pipe).
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	RL, WC, EW, AM offsite.
16:30	CN offsite.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 75 -- 84 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	26-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops at Hangar AO to talk with George Reed at SpaceX central receiving and SpaceX 39A receiving to talk to
7:45	Ricky Udo. Neither can find the Tetra Tech shipment that George Reed received.
8:00	RL, EW, WC & AM onsite.
8:15	EW resumes excavating trench in Area C with AM as spotter. RL and WC tefloning and erecting parts.
8:20	
8:30	
8:40	
9:00	CN onsite. Tailgate meeting.
9:15	CN, RL, WC setting up to pull two 2-inch HDPE for Area E/F from intersection of north Pad driveway and Perimeter
9:20	Road through Area D.
9:30	
9:40	
9:45	
10:00	
10:15	Discover that toggle for winch is broken.
10:30	CN offsite to purchase toggle and additional supplies. RL and WC offsite to LC-34 to retreive Kubota tractor for mowing
11:30	39A work area.
12:00	EW and AM Lunch
12:30	CN returns to site. EW and AM resume trench excavations in Area C.
13:15	RL and WC return to site. RL begins mowing. WC repairing toggle on winch.
13:30	AM offsite. CN, RL, WC laying 500' of 2-inch HDPE.
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	WC offsite. CN and RL housekeeping.
16:00	EW offsite.
16:15	CN and RL offsite.
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 74 -- 84 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	29-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:20	CN stops for ice.
7:45	
8:00	CN and EW onsite. Tailgate.
8:15	EW resumes excavating trench in Area C with CN spotting for utilities.
8:20	
8:30	
8:40	
9:00	
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	CN on Kubota tractor mowing around trenches.
10:15	
10:30	
11:30	
12:00	EW Lunch
12:30	CN lunch. EW resume trenching with CN spotting.
13:15	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	All offsite.
16:15	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 74 -- 86 ^{0} F

Weather Conditions: Thunderstorm

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	30-Sep
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, WC, and EW onsite. Tailgate.
8:15	EW on mini excavator begins trenching north end of Area A with WC spotting for utilities.
8:20	
8:30	
8:40	
9:00	
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	
10:15	
10:30	
11:30	
12:00	EW completes leg of Area but needs to stop in order to maintain an access area for SpaceX working on LOX. Lunch.
12:30	EW tracks mini excavator to south end of Area E to trench 4 air sparge wells on south side of concrete flume. CN and
13:15	WC remarking utilities and spotting.
13:30	
13:40	
14:00	CN and WC to Area B to remark utilities and trench line, mow and then repaint.
14:25	
14:30	
14:40	
14:45	
15:00	EW tracks mini excavator to south end of Area B and begins trenching to north.
15:15	
15:50	Rains begin.
16:00	All offsite.
16:15	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 72 -- 86 ^{0} F

Weather Conditions: Thunderstorm

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	1-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM	X	Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, WC, JM, RO onsite. Tailgate.
8:15	EW onsite.
8:20	WC mowing field west of utility rack for JM and RO to mark utilities in area between rack and trailer.
8:30	
8:40	
9:00	WC assisting Chase of SpaceX to use 3-inch pump to pump out vault.
9:15	
9:20	
9:30	JM and RO offsite. CN mowing area north of camera pad around trenches (full of water).
9:40	
9:45	
10:00	WC assisting EW at utility crossing
10:15	
10:30	
11:30	
12:00	Lunch
12:30	All setup to lay 500 feet of 2-inch HDPE from intersection of north pad driveway and Perimeter Road through Area D
13:00	for Area E.
13:15	Load 2-inch spool on reel, position skid steer and 4x4 with winch.
13:40	EW operating winch. CN walking cable and guiding pipe. WC cutting straps on spool. Two setups for 4x4 to complete
14:00	pull.
14:25	
14:30	EW resumes trenching Area B with sporadic assistance from CN when crossing utilities.
14:40	CN marking trench path from above ground utility crossing and Area B to trailer location. WC measuring distances
14:45	from cabinet locations to trailer for 2-inch piping.
15:00	
15:15	
15:50	
16:00	All offsite.
16:15	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 73 -- 83 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	2-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM	X	Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

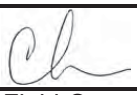
Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	WC onsite at 39A fueling mini.
8:00	CN and EW onsite at 39A. Tailgate.
8:10	EW in mini excavator resumes trenching Area B with sporadic assistance from WC when crossing utilities. WC loading
8:15	4x4 with tools and supplies to install pipe racks at Areas D and C.
8:20	CN on calls regarding LC-34.
8:40	
9:00	CN and WC installing pipe rack at Area D. Consulted with MD on cabinet orientation and MD selected 45 degrees NE.
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	
10:15	
10:30	
11:30	CN and WC spotting for EW in Area B.
12:00	Lunch
12:30	CN and WC prepare to install pipe rack for Area C.
13:00	WC spotting for EW. CN makes phone call to Anne Chrest for clarification of scope for questions regarding LOC2D
13:30	and LOC2E removal @ headquarters.
13:40	
14:00	CN and WC install pipe rack for Area C.
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:50	
16:00	All offsite.
16:15	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 73 -- 86 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	3-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, WC and EW onsite at 39A. Tailgate.
8:15	CN, WC and EW perform housekeeping activities.
8:20	
8:30	
8:40	
9:00	EW on mini excavator resumes trenching Area B. CN and WC setup to lay 1-inch HDPE in Area D.
9:15	
9:20	
9:30	CN and WC layng 1-inch pipe in Area D.
9:40	
9:45	
10:00	
10:15	
10:30	
11:30	
12:00	Lunch
12:30	All resume.
13:00	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:50	
16:00	All offsite.
16:15	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 73 -- 89 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	6-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

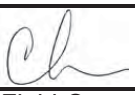
Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, WC and EW onsite at 39A. Tailgate.
8:15	EW in mini excavator resumes trenching in Area B west of utility rack. CN and WC transport spare 1-inch pieces from
8:20	Area E/F to Area C.
8:30	
8:40	
9:00	
9:15	
9:20	
9:30	EW tracks mini excavator to top of camera pad to trench across asphalt and down steep slope. WC fueling mini
9:40	excavator. CN using spare pieces to lay 3 more lines in Area D.
9:45	
10:00	EW trenching steep slope with WC spotting. CN responding to emails and phone calls.
10:15	
11:00	CN hand excavating around AS77, trench bottom and edges.
11:30	CN and WC resume pulling 1-inch to AS wells on top of camera pad. EW trenching second asphalt crossing for
11:45	northern area D air sparge piping.
12:00	Lunch
12:30	All resume. RL onsite assisting CN and WC.
13:00	
13:30	
14:00	EW on mini excavator placing two thirds of backfill in trenches on top of camera pad and steep slope down to AS77.
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:50	
16:00	All except one AS line laid. All offsite.
16:15	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 61 -- 82 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	7-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, WC, EW, RL onsite. Tailgate.
8:15	Watkins oil onsite. RL and WC load tools and supplies to resume laying 1-inch HDPE. EW on mini excavator resumes
8:20	placing two thirds backfill in trench along north edge of camera pad.
8:30	
8:45	CN, RL, WC begin laying 1-inch HDPE in Area C.
9:00	
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	
10:30	CN assisting EW by holding pipes on trench bottom in trenches full of water as EW places BF in Area D north of
11:00	camera pad.
11:30	
12:00	Lunch
12:30	CN, RL and WC resume in Area C. EW placing BF in Area D Trenches south of camera pad.
13:00	CN, EW offsite to FDSA for EW to drive a second 4x4 from FDSA to 39A.
13:30	CN and EW return to resume tasks.
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	Area C piping complete. RL and WC housekeeping. EW excavating beneath LOX pipes with CN spotting. Unmarked
15:05	electrical cable encountered in excavation. CN left voicemails for JM and RO. EW proceeds with WC spotting.
15:10	
15:15	CN offsite to transport trailer to LC-34.
15:45	CN drops trailer and leaves site.
16:00	RL, WC, EW offsite.
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 68 -- 86 ^{0} F

Weather Conditions: Mostly Sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	8-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	CN and RL at LC-34 staging trailer and loading packers on trailer for SV to take to welder for fittings.
8:00	EW, WC, AM on site at LC39A.
8:15	EW on mini excavator resumes excavating 2-inch trench between Areas C and D and under LOX pipe with AM
8:20	spotting. WC loading 4x4 with tools and supplies to lay wire and marking tape in Area E/F. CN receives call from JM
8:25	that electrical line from last night is not active and to proceed.
8:30	CN and RL arrive onsite at LC-39A. Area E/F needs more fill placed prior to wire/tape due to compaction from rains.
9:20	WC on skid placing backfill in Area E/F.
8:45	RL off-site for muck boots. CN on Kubota mowing around Area E/F trenches.
9:00	EW and AM move to area between the LOX pipes and the utility rack to start trenching across.
9:15	
9:30	
9:45	
10:00	RL returns to LC-39A, setting up to pump water and install 3 tees not installed in Area E/F before due to running out of
10:30	CN and WC assisting RL install 3 tees. EW and AM move to Area B to trench beneath utility rack.
11:00	
11:30	
12:00	Lunch
12:30	
13:00	Too wet to lay tape/wire in Area E/F. CN, WC, RL setup to lay 500 ft 2-inch from Area A towards trailer. EW and AM
13:30	trench beneath rack for 2-in piping.
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	CN, WC, RL lay 500 ft 2-inch from Area C cabinet to trailer (10 feet short). EW and AM trenching in Area B west of
15:15	utility rack.
15:45	
16:00	All offsite.
16:15	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 69 -- 86 ^{0} F

Weather Conditions: Mostly Sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	9-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

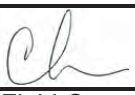
Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, RL, EW, WC, AM onsite. Tailgate. AM sampling today.
8:15	EW on mini excavator excavating main header trench from Area B to trailer. CN, RL, WC setup to pull 500 foot
8:20	sections of 2-inch HDPE from Area D and where Area E/F 2-inch pipes stopped.
8:30	
8:45	
9:00	
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	
10:30	
11:00	FedEX onsite delivering 12 cabinets for manifolds. RL on Kubota unloading.
11:30	RL returns to assisting CN and WC.
12:00	Lunch
12:30	All resume.
13:00	
13:30	Pulling 2-inch pipe from Area B to trailer. RK onsite to assist AM.
13:40	
14:00	
14:25	
14:30	RL and WC setup to install pipe rack at Area B.
14:40	
14:45	
15:00	
15:15	
15:30	CN offsite.
16:00	CN to FedEX. EW, RL, WC, AM, RK offsite.
16:15	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 68 -- 85 ^{0} F

Weather Conditions: Mostly Sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	10-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, RL, EW, WC onsite. Tailgate. AM and RK sampling today.
8:15	EW on mini excavator resumes excavating trench from Area B to trailer location. CN, RL, WC setup to lay 1-inch
8:20	HDPE in Area B.
8:30	
8:45	RL and WC laying 1-inch HDPE. CN hand excavating areas EW left in trenches to dam water.
9:00	
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	RL spotting EW at utility crossings. CN assisting WC laying pipe.
10:30	
11:00	MD oniste. CN provides status update.
11:30	MD offsite. CN and WC resume.
12:00	Lunch
12:30	All resume. EW placing backfill in Area D.
13:00	
13:30	
13:40	
14:00	
14:25	
14:30	Area B 1-inch pipe complete; perform housekeeping activities.
14:40	
14:45	
15:00	CN, RL, WC move 2-inch HDPE for Area B to trailer to where Area A 2-inch pipe ended to trailer (initially too short for
15:15	run from Area B to trailer).
15:30	
16:00	All offsite.
16:15	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 69 -- 86 ^{0} F

Weather Conditions: Mostly Sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	13-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	EW onsite on mini excavator and resumes backfilling Area D. CN, RL, WC onsite CCB to load four 1-inch, 20-ft steel
8:15	pipes and to FDSA to load 500-ft spool of 2-in HDPE.
8:20	
8:30	
8:45	
9:00	
9:15	CN, RL, WC onsite. Tailgate.
9:20	
9:30	CN, RL, WC replacing 2-inch HDPE from Area B to trailer with spool picked up from FDSA.
9:40	
9:45	
10:00	
10:45	CN, RL, WC weld 2-inch couplers on lines for Areas A, D and C.
11:00	
11:30	
12:00	Lunch
12:30	Resume. EW on mini excavator placing backfill from trailer south towards Area B. CN, RL, WC weld 2-inch couplers
13:00	on lines for Areas E/F.
13:30	WC on skid steer assisting EW. RL and CN gather tools and supplies to reconstruct pipe rack at Area E/F due to
13:40	tension on 1-inch pipes at rack when backfill placed (moving rack 18-inches west).
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	Unistruts placed in concrete and 1-inch pipe clamps loosened. CN and RL installing wire and marking tape.
15:15	
15:30	CN, WC, RL, placing wire and marking tape from trailer to Area B pipe rack.
16:00	All offsite.
16:15	
16:45	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 75 -- 86 ^{0} F

Weather Conditions: Mostly Sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	14-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, RL, WC onsite. Tailgate.
8:15	WC on skid steer placing backfill in Area B with CN and RL placing wire and marking tape.
8:20	
8:30	
8:45	
9:00	
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	
10:30	EW onsite. EW on mini excavator placing backfill in trenches in Area B between the LOX pipe and utility rack. Skid
11:00	steer broke down. WC offsite for trailer to haul skid steer offsite for repair. RL continues to place wire and marking
11:30	
12:00	Lunch
12:30	EW resumes. RL on Kubota tractor backfilling Area B trenches with EW on mini excavator leveling backfill for wire and
13:00	marking tape placement.
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	RL offsite.
16:15	
16:45	
17:00	CN and EW offsite.
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 72 -- 87 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	15-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, EW, WC onsite. Tailgate.
8:15	EW on mini excavator leveling backfill six inches below ground surface for CN to place wire and marking tape in Area
8:20	B. WC on skid steer covering wire and tape and grading.
8:30	
8:45	
9:00	EW leveling backfill across camera pad.
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	
10:30	Ran out of wire. Called CH for recommended suppliers. Placed calls to companies for pricing.
11:00	EW placing backfill in Area D trenches.
11:30	
12:00	Lunch
12:30	RL onsite. EW leveling backfill in backfilled trench. WC on skid steer placing backfill in main header trench east of
13:00	camera pad. CN and RL check to see if Area E/F rack reconstruction can be done - too wet.
13:30	EW leveling backfill in main header trench east of camera pad.
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	CN offsite for supplies.
15:15	
15:30	
16:00	EW, RL,WC offsite.
16:15	
16:30	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 67 -- 82 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	16-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, RL, WC, EW onsite. Tailgate.
8:15	EW on mini excavator resumes placing and leveling backfill in Area C. CN and RL placing wire and marking tape. WC
8:20	on skid steer covering wire and tape and grading along main header trench in Area D.
8:30	
8:45	
9:00	
9:15	
9:20	
9:30	RL offsite to start up 516 trailer. CN collecting GPS points for Area D trenches and main header trench to Area E/F.
9:40	
9:45	
10:00	
10:30	CS onsite to collect soil samples. CN installing wire and marking tape in Area D laterals.
11:00	
11:30	
12:00	Lunch
12:30	All resume. CN completes 3 laterals in Area B with wire and tape before resuming in Area D.
13:00	
13:30	
13:40	
14:00	
14:25	
14:30	CN conference all with CP and JB to begin scheduling soil excavation activities.
14:40	
14:45	
15:00	CN resumes placing wire and tape.
15:15	
15:30	
16:00	EW and WC offsite.
16:15	
16:30	CN offsite.
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 59 -- 80 ^{0} F

Weather Conditions: Sunny, Clear

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	17-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

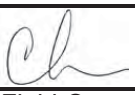
Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, EW, WC onsite. Tailgate.
8:15	EW on mini excavator leveling backfill in Area D. CN and WC installing marking tape and wire in Area C. WC on skid
8:20	steer covering tape and wire and grading.
8:30	
8:45	
9:00	
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	
10:30	
11:00	
11:30	
12:00	Lunch
12:30	All resume. EW leveling backfill in Areas E/F. CN and WC laying tape and wire in Area D. WC on skid steer covering
13:00	tape and wire and grading.
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	All offsite.
16:15	
16:30	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 62 -- 79 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	20-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN and EW onsite. Tailgate.
8:15	EW on mini excavator resumes leveling backfill in Areas E/F.
8:20	
8:30	
8:45	
9:00	
9:15	
9:20	
9:30	AM onsite. AM loading 4x4 with tools and supplies to install tees.
9:40	
9:45	
10:00	CN and AM installing tees in Area D.
10:30	
11:00	
11:30	
12:00	Lunch
12:30	All resume.
13:00	
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	15 tees installed. All offsite.
16:15	
16:30	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 67 -- 83 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	21-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, RL, WC, EW, AM onsite. Tailgate.
8:15	EW on mini excavator leveling backfill in Areas E/F and backfilling tees.
8:20	
8:30	
8:45	
9:00	
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	
10:30	
11:00	CN and AM prewelding couplers onto tees. RL and WC welding transitions on pipe rack in Area D.
11:30	
12:00	Lunch
12:30	All resume. CN, RL, AM laying wire and marking tape in Areas E/F. EW on mini excavator backfilling around tees.
13:00	WC on skid steer covering tape and wire and grading.
13:30	
13:40	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	All offisite. Phase II.
16:15	
16:30	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 66 -- 83 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	22-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

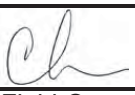
Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, EW, AM and WC onsite. Tailgate.
8:15	CN and AM replacing fiberglass pole markers with plastic orange stakes at Area E/F air sparge well locations. EW on
8:20	mini excavator resumes backfilling tees. WC on skid steer resumes covering tape and wire and grading.
8:30	
8:45	
9:00	CN and AM relocate pipe rack for Area E/F to new unistruts set last week.
9:15	
9:20	
9:30	RL onsite and assists CN and AM.
9:40	
9:45	
10:00	
10:30	
11:00	CN, AM, and RL weld 90 degree elbow on 2-inch pipe and clamp onto pipe rack at Area E/F.
11:30	
12:00	Lunch
12:30	WC resumes. RL replacing poles with stakes. AM spotting EW as he backfills pipe rack at Area E/F.
13:00	
13:30	
13:40	
14:00	RL placing fiberglass poles at air sparge wells in Area B. EW transporting mini excavator to Area B to backfill tees. CN
14:25	records GPS points for the trenches in Areas E/F.
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	
16:00	EW, RL, AM, WC offsite.
16:15	
16:30	CN offsite.
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 68 -- 81 ^{0} F

Weather Conditions: Hazy Fog

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	23-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, AM, WC, EW onsite. Tailgate.
8:15	CN and AM replacing fiberglass poles with plastic orange stakes in Areas E/F. Discover wheel loader tracks through
8:20	the area and CN places calls to SpaceX superintendent and pad leader to discuss preventing recurrence. After a long
8:30	search, could not find two air sparge wells. EW on mini excavator backfilling tees in Area B. WC on skid steer grading.
8:45	
9:00	
9:15	
9:20	
9:30	
9:40	
9:45	
10:00	
10:30	CN and AM transfer fiberglass poles from Areas E/F and B to Area D north and install wire and marking tape. EW
10:45	backfilling tees in Area D north. WC grading along LOX pipeline as requested by SpaceX for telehandlers to access
11:00	the LOX line.
11:30	WC on skid steer covering wire and tape in Area D north. CN and AM begin installing tees in Areas D and C.
12:00	Lunch
12:30	All resume, working south through Areas C and D.
12:00	
12:30	
14:00	
14:25	
14:30	
14:40	
14:45	
15:00	
15:15	
15:30	CN and AM weld 90 degree elbow on 2-inch at Area D pipe rack.
16:00	All offsite.
16:15	
16:30	
17:00	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 64 -- 78 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	24-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

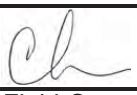
Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, AM, EW, WC onsite. Tailgate.
8:15	CN and AM complete installation of 2-inch onto rack at Area D. EW on mini resumes backfilling tees. WC on skid
8:30	steer resumes backfilling and grading.
8:45	CN and AM proceed to install tees in Area C and lay tape and wire in Area C.
9:00	
9:15	
9:30	
9:45	
10:00	
10:15	
10:30	
10:45	
11:00	
11:15	
11:30	
11:45	
12:00	Lunch
12:30	All resume.
13:00	
13:15	
13:30	CN stops to submit timesheet, reply to emails, and call Steve Ruffing. WC assisting AM.
13:45	
14:00	
14:15	CN returns to assist AM. WC resumes covering tape and wire and grading.
14:30	
15:00	
15:15	
15:30	All tees, tape and wire installed (except Area A). CN and AM housekeeping.
16:00	All offsite.
16:15	CN stops to search PC for email for procurement from KARS Park to support audit.
16:30	
17:00	CN offsite.
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 60 -- 78 ^{0} F

Weather Conditions: Cloudy/Partly Sunny

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	27-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP	X	Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stops for ice.
7:45	
8:00	CN, EW, WC, RL onsite. Tailgate.
8:15	RL offsite with one of the 4x4s to sample wells at CCB. EW on mini excavating trenches for Area B. CN and WC setup
8:30	3-inch pump to pump water from the lined pond to flood backfill in trenches across asphalt between Areas A and C.
8:45	
9:00	
9:15	
9:30	
9:45	
10:00	WC spotting for EW to trench past utilities.
10:15	
10:30	
10:45	
11:00	CP onsite. CN takes CP on tour of site.
11:15	
11:30	
11:45	
12:00	Lunch. CP self touring future soil excavation areas being staked by surveyors.
12:30	EW and WC resume. CN loads tools and supplies to install tees and 1-inch piping in Area E for air sparge wells 86, 87,
13:00	92 and 93.
13:15	
13:30	
13:45	
14:00	
14:15	
14:30	
15:00	CP returns and assists CN installing two tees.
15:15	
15:30	CP offsite. CN housekeeping.
15:50	CN and WC transport RL's truck to CCB.
16:00	EW offsite.
16:10	CN and WC return for WC's truck. Call from RL; 4x4 stuck.
16:15	CN and WC offsite to assist RL.
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 57 -- 82 ^{0} F

Weather Conditions: Hazy Fog

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	28-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP	X	Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN at Home Depot for materials.
7:45	
8:00	WC and EW onsite. EW on mini excavator resumes trenching in Area B. WC on skid steer placing two-third backfill in
8:15	Area E for air sparge wells 86, 87, 92 and 93 and placing wire.
8:30	
8:45	
9:00	
9:15	
9:30	CN onsite. Tailgate.
9:45	CN and WC building forms for Areas C and D concrete pads. EW erecting HDPE brass transitions with shark bites.
10:00	
10:15	
10:30	
10:45	
11:00	CP and MD onsite. FWS onsite to catch two gators in lined pond. CN discussed project status and schedule with CP
11:15	and MD.
11:30	
11:45	
12:00	CP and MD touring future excavations. Lunch.
12:30	CN and WC resume building forms. EW erecting bases to manifold legs.
13:00	
13:15	
13:30	
13:45	
14:00	
14:15	
14:30	
15:00	CN and WC place marking tape in Area E for air sparge wells 86, 87, 92 and 93.
15:15	
15:30	WC on skid steer coving tape and wires. CN housekeeping.
15:50	
16:00	All offsite.
16:10	
16:15	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 60 -- 82 ^{0} F

Weather Conditions: Hazy Fog

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	29-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	
8:00	CN and EW onsite.
8:15	WC onsite with dump truck load of topsoil. Tailgate.
8:30	WC dumped topsoil adjacent to soil excavation Area 26. CN painted boundaries for Area 26. EW on mini excavator
8:45	begins excavating 6-inches from Area 26 and placing soil in dump truck. CN and WC hand shoveling edges and
9:00	checking depth for EW.
9:15	
9:30	
9:45	
10:00	
10:15	
10:30	
10:45	
11:00	
11:15	
11:30	
11:45	
12:00	Area 26 excavation complete. Lunch
12:30	CN paints Area A trench pathways for EW to begin trenching from south to north. WC on skid steer placing topsoil in
12:45	Area 26 excavation.
13:00	CN and WC lay visqueen in parking lot between Area A and Area C, dump Area 26 soil on visqueen and cover the pile
13:30	with visqueen.
13:45	
14:00	
14:15	
14:30	WC spotting for EW to trench across utility markings.
15:00	
15:15	
15:30	
15:50	
16:00	All offsite.
16:10	
16:15	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 62 -- 84 ^{0} F

Weather Conditions: Hazy Fog

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	30-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN at Home Depot for supplies.
7:45	
8:00	WC and EW onsite at LC-39A. RL at LC-34 to unlock for CN and then to CCB to resume sampling.
8:15	EW resumes trenching Area A with WC spotting.
8:30	
8:45	
9:00	CN onsite LC-34 to gather materials needed at LC-39A.
9:15	
9:30	CS onsite LC-34 to drop off 55-gallon drum of Redux. CS needed assistance from CN to open the drum bung.
9:45	
10:00	CN and CS hook up trailer and load the Kubota tractor for transport to LC-39A.
10:15	
10:30	CS offsite. CN verifying measurements of interior building dimensions for placement of new system components for
10:45	
11:00	Mark Jonnet (MJ) onsite assisting CN.
11:15	
11:30	MJ offsite. CN call to CH.
11:45	
12:00	CN to LC-39A.
12:30	Lunch.
12:45	
13:00	EW resumes trenching. WC building forms. CN call to Pirtek to replace hydraulic fittings on the Kubota.
13:30	
13:45	
14:00	
14:15	
14:30	Pirtek onsite.
15:00	
15:15	
15:30	Pirtek offsite. EW offsite.
15:50	
16:00	WC offsite. CN call with MD.
16:10	
16:30	CN offsite.
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 62 -- 84 ^{0} F

Weather Conditions: Hazy Fog

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	31-Oct
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN at Firestone for truck service.
7:45	
8:00	EW and WC onsite. EW erecting manifold legs. WC building concrete pad forms.
8:15	
8:30	CN at Home Depot for supplies.
8:45	
9:00	
9:15	
9:30	WC fitting unistrut pieces to assemble rack for steel piping for AS wells 86, 87, 92 and 93. CN to Titusville to track
9:45	down concrete supplier not returning phone calls. Family says that they have not heard from him in two days.
10:00	
10:15	
10:30	CN stop at CCB for ice.
10:45	
11:00	CN onsite. CN and EW gathering supplies to erect steel piping. CS onsite for parts to repair damaged air sparge wells
11:15	at POL. EW disassembling extra tees for parts for CN and CS.
11:30	
11:45	CS offsite.
12:00	Lunch
12:30	Call with MD. WC resumes building concrete forms. EW resumes erecting manifold legs. CN making calls to arrange
12:45	backup concrete plan for next week.
13:00	
13:30	
13:45	
14:00	
14:15	
14:30	
15:00	EW and WC offsite.
15:15	
15:30	CN offsite.
15:50	
16:00	
16:10	
16:30	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 62 -- 79 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	3-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN at Home Depot for supplies.
7:45	
8:00	EW and WC onsite 39A. RL checking on 516, FDSA, and CCB. EW resumes erecting parts for manifold legs. WC
8:15	housekeeping.
8:30	
8:45	
9:00	CN and RL onsite. Tailgate.
9:15	Call from Rich Wall of U-Haul Concrete. Change in plans for the day.
9:30	
9:45	WC offsite to pick up 8-inch manholes delivered to Tiki Shack then to Titusville to pick up load (1cy) of concrete. CN
10:00	and RL staking and leveling form for Area D cabinets and one air sparge well in Area B within 10-feet of LOX pipe.
10:15	
10:30	
10:45	
11:00	
11:15	
11:30	
11:45	
12:00	Lunch.
12:30	WC onsite with concrete. CN, WC, RL pouring Area D pad and finishing concrete.
12:45	
13:00	
13:30	
13:45	
14:00	
14:15	
14:30	
15:00	
15:15	
15:30	Housekeeping.
15:50	
16:00	All offsite.
16:10	
16:30	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 50 -- 72 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	4-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	X
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice. CN received call from Mike Villeneuve at 39A gate; CN told him where asphalt was needed for him to
7:45	complete a take off for quote. RL checking on CCB system for Mark Jonnet.
8:00	CN and EW on site. EW resumes erecting parts for manifold legs. CN beings staking and leveling form for Area C
8:15	cabinets.
8:30	RL onsite assisting CN.
8:45	
9:00	
9:15	
9:30	WC onsite with second load of concrete (1 1/8 cubic yards). CN, WC, RL, pouring Area C pad.
9:45	
10:00	
10:15	
10:30	
10:45	
11:00	RL finishing Area C pad as CN and WC pour one 3x3 pad for air sparge well in Area B within 10-feet of LOX pipe.
11:15	
11:30	SV onsite. CN and SV measure cabinet and spacing on pad for SV to order parts for mounting manifold blocks in
11:45	cabinets and splitting 2-inch HDPE into two 1-inch lines to cabinets. RL finishing well pad.
12:00	EW lunch. WC and RL staking and leveling second well pad.
12:30	SV offsite. CN assisting RL and WC pour second well pad.
12:45	
13:00	RL finishing second well pad.
13:30	Lunch (CN, WC, RL).
13:45	
14:00	CN, RL, WC staking and leveling two more well pads.
14:15	
14:30	
15:00	
15:15	
15:30	CN, RL, WC removing form from Area D pad for reuse.
15:50	
16:00	EW offsite.
16:15	CN, RL, WC transport Area D form to Area B.
16:30	All off-site.
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 61 -- 79 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	5-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	
8:00	CN, AM, EW onsite. Tailgate.
8:15	EW resumes assembling parts for manifold legs. CN and AM staking and leveling form for Area B concrete pad.
8:30	
8:45	
9:00	RL onsite assisting CN and AM.
9:15	
9:30	WC onsite with third load of concrete (1 1/8 cubic yards) CN, AM, RL, WC pouring pad.
9:45	
10:00	
10:15	
10:30	
10:45	
11:00	CN, WC, AM pouring two 3x3 well pads in Area B as RL works on finishing 8x8 pad.
11:15	
11:30	
11:45	
12:00	Lunch (except RL).
12:30	RL lunch. WC and AM staking and leveling 3x3 air sparge pad.
12:45	
13:00	EW on mini excavator trenching in Area A with AM spotting at utility crossings. RL and WC building form (13x8) for
13:30	Area E/F pad.
13:45	
14:00	
14:15	
14:30	
15:00	
15:15	
15:30	
15:50	
16:00	All offsite.
16:15	
16:30	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 59 -- 81 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	6-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

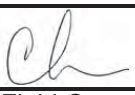
Time	
6:30	
7:15	
7:30	CN stop for ice.
7:45	
8:00	CN, EW, AM onsite. Tailgate.
8:15	EW on mini excavator resumes excavating trenches in Area A with AM spotting.
8:30	
8:45	
9:00	CN and AM leveling and staking 13x8 form for Area E/F cabinet pad.
9:15	RL onsite assisting CN and AM.
9:30	WC onsite with fourth load of concrete (1 1/8 cubic yards). WC assisting CN and AM and RL.
9:45	
10:00	CN, RL, AM, WC pouring pad.
10:15	
10:30	EW completes trenching, begins installing female quick connects into manifold blocks.
10:45	
11:00	
11:15	
11:30	CN, AM, and WC pouring 3x3 well pad in Area B within 10 feet of LOX pipe. RL finishing pad at Area E/F.
11:45	
12:00	CN, AM, and WC installing pipe rack at Area A with last of concrete load.
12:30	Lunch.
12:45	
13:00	EW resumes. CN, AM, WC and RL hand excavating and installing manholes at 3 air sparge wells in asphalt to prep for
13:30	concrete.
13:45	
14:00	
14:15	
14:30	
15:00	CN, RL, AM, and WC staking and leveling forms for two 3x3 well pads in Area B within 10 feet of LOX piping.
15:15	
15:30	
15:50	
16:00	WC, RL, and EW offsite. AM and CN marking pipe rack in Area A with pipe locations.
16:15	
16:30	All offsite.
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 61 -- 82 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	7-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	CN at WC's house to pick up concrete trailer.
7:30	CN to Titusville for fifth load of concrete (3/4 + 1/8 cubic yard)
7:45	
8:00	AM, WC, RL, EW onsite. EW resumes installing female quick connects into manifold blocks. WC, RL, AM set up to lay
8:15	1-inch HDPE in Area A.
8:30	
8:45	
9:00	
9:15	MD onsite.
9:30	CN onsite with concrete. AM, WC, and RL pouring concrete in three areas of asphalt and 3 air sparge well pads in
9:45	Area B. CN discusses project status with MD and tours site.
10:00	
10:15	
10:30	
10:45	
11:00	
11:15	
11:30	MD offsite. CN assisting with concrete.
11:45	
12:00	
12:30	Lunch.
12:45	
13:00	RL offsite. AM, WC resume laying and racking 1-inch pipe. EW on mini placing two-thirds of backfill in Area A
13:30	trenches.
13:45	
14:00	
14:15	
14:30	
15:00	WC on skid steer placing backfill. AM housekeeping.
15:15	
15:30	
15:50	
16:00	All offsite. CN returning concrete cart to Titusville.
16:15	
16:30	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 55 -- 72 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	10-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

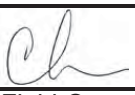
Time	
6:30	
7:00	
7:30	CN stop for ice.
7:45	
8:00	CN, AM, EW onsite. Tailgate.
8:15	EW on mini excavator resumes leveling two-thirds backfill in Area A. CN and AM preparing to resume excavation of 2-
8:30	inch main header trench to edge of asphalt at road crossing.
8:45	
9:00	
9:15	
9:30	EW excavating main header trench to edge of asphalt with AM spotting for utilities.
9:45	
10:00	
10:15	
10:30	
10:45	
11:00	
11:15	
11:30	
11:45	
12:00	Lunch. Rains begin.
12:30	Heavy rains. CN, AM, EW erecting manifold legs.
12:45	
13:00	
13:30	
13:45	
14:00	CN planning contaminanted soil excavation sequencing.
14:15	
14:30	
15:00	
15:15	
15:30	
15:50	
16:00	All offsite.
16:15	
16:30	
17:15	
17:20	
17:30	
18:00	

Comments: RL checking on 516 site. 516 blew an air line attached to the compressor. RL at 516 all day repairing break.

Temperature Range: 60 -- 73 ^{0} F

Weather Conditions: Thunderstorms

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	11-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	CN stop for ice.
7:45	CN at LC-34 to measure for concrete placement.
8:00	EW and AM onsite at 39A. Resume erecting manifold legs.
8:15	RL and CS onsite at 34. RL transfers parts delivered to CN's truck. RL and CS cleaning air stripper today.
8:30	CN to 39A.
8:45	
9:00	CN receives call from John Zwahl of AWMS to discuss transport and disposal logisitics for upcoming excavations.
9:15	
9:30	CN and AM installing tees in Area A.
9:45	
10:00	
10:15	
10:30	
10:45	
11:00	
11:15	
11:30	
11:45	
12:00	Lunch.
12:30	CN and AM resume. EW on mini excavator backfilling installed tees.
12:45	
13:00	
13:30	
13:45	
14:00	
14:15	
14:30	
15:00	
15:15	
15:30	
15:45	All but 3 tees installed (too wet). Housekeeping.
16:00	All offsite.
16:15	
16:30	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 58 -- 74 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	12-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	CN stop for ice.
7:45	
8:00	CN, RL, EW, WC, AM onsite. Tailgate.
8:15	CN, AM, RL installing last 3 tees. EW on mini excavator excavating sumps adjacent to tees to drain water away to
8:30	allow tee installation. WC on skid steer backfilling main header trench near road crossing.
8:45	
9:00	
9:15	
9:30	EW backfilling tees. CN, RL, WC, AM laying wire and warning tape in Area A.
9:45	
10:00	EW leveling backfill in main header trench.
10:15	
10:30	CN and EW offsite to retreive 4x4 from CCB. RL, WC, AM installing tape and wire in main header trench.
10:45	
11:00	CN and EW return. EW on mini excavator covering tape and wire in Area A. WC on skid steer covering tape and wire
11:15	in main header trench and grading. RL and AM installing HDPE to brass transitions in Areas C and B.
11:30	
11:45	
12:00	Lunch.
12:30	EW resumes. WC on skid steer covring tape and wire in Area A and grading. RL and AM installing transitions at Areas
12:45	E/F and A. CN touring 15 excavation areas and painting boundaries.
13:00	
13:30	
13:45	
14:00	
14:15	
14:30	
15:00	RL and AM welding 2-inch couplers on 90 degree angles (6).
15:15	
15:30	RL offsite to 516. CN and AM housekeeping.
15:45	
16:00	AM, WC, EW offsite. CN sends email to Todd Ziegler regarding road closure tomorrow and Friday for pipe installation
16:15	and paving.
16:30	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 56 -- 75 ^{0} F

Weather Conditions: Sunny/Clear

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	13-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	CN stop for ice.
7:45	
8:00	CN, RL, EW, WC, and AM onsite at 39A. Tailgate.
8:15	CN, AM, and RL setup traffic controls to close north pad access road. EW on mini excavator removing asphalt from
8:30	road cut and placing in skid bucket. WC on skid steer placing asphalt into dump trailer.
8:45	
9:00	CN providing traffic control. RL and AM plumbing 300 gallon polytank with discharge hose and retrieving water. EW
9:15	trenching across road placing limestone on one side of trench and soil on the other.
9:30	
9:45	
10:00	CN, RL, and WC placing and welding 2-inch HDPE pipes for Areas E/F.
10:15	
10:30	WC placing lift of backfill. CN adding water and EW leveling and compacting with mini bucket. Repeat with all soil
10:45	backfill and proceed with limestone on top.
11:00	
11:15	
11:30	
11:45	
12:00	Lunch.
12:30	CN, RL, WC, and AM tour and plan soil excavation stockpiling and equipment needs. EW backfilling remaining open
12:45	trench across concrete box culvert.
13:00	
13:30	
13:45	
14:00	RL, WC, and AM removing form from one of the pads and staking and leveling form for Area A pad.
14:15	
14:30	
15:00	
15:15	
15:30	
15:45	
16:00	All offsite.
16:15	
16:30	
17:15	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 57 -- 77 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy

--

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	14-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

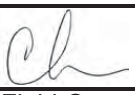
Time	
6:30	
7:00	
7:30	CN to U-Haul concrete in Titusville.
7:45	
8:00	Call from Mike Villeneuve of JH Villeneuve asphalt about damaging electrical box in new asphalt area at LC34. EW
8:15	and AM onsite at 39A. CN calls AM and asks him to gather supplies to meet WC at LC-34 to install form boards for
8:30	electrical vault and asphalt to concrete transition. RL assisting SV at 516 after setting out summas at CCB.
8:45	CN at concrete yard for 1 1/8 cubic yard concrete.
9:00	
9:15	
9:30	
9:40	CN to 39A.
10:00	
10:15	CN onsite at 39A. CN begins pouring Area A pad.
10:30	
10:45	
11:00	
11:10	AM, EW, and WC, onsite at 39A. EW erecting manifold for SV. AM and WC pouring and finishing pad.
11:20	CN offsite to meet MD at LC-39B to look at 5 excavation areas.
11:45	
12:00	
12:30	
12:45	CN returns. AM and WC beginning to stake and level one of two 3x3 pads for air sparge wells within 10 feet of utility
12:55	rack.
13:00	CN finishing Area A pad.
13:45	
14:00	CN assisting AM and WC pouring second 3x3 pad.
14:15	
14:30	
15:00	CN, AM, WC setting pipe rack for 2-inch pipes at system trailer location.
15:15	CN leaves AM and WC to complete and submit timesheet and order silt sock for excavations.
15:30	
15:45	AM and WC housekeeping.
16:00	WC offsite. CN and AM going over plans and duties for next week.
16:15	
16:30	
17:00	EW offsite.
17:20	
17:30	
18:00	CN and AM offsite. CN returning concrete cart to Titusville; arrives at 18:30.

Comments:

Temperature Range: 58 -- 64 ^{0} F

Weather Conditions: Hazy/Fog

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	17-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN			Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X		Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	
Project Manager:	Chris Pike	CP			Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH			Randy Keyser	RK	
Project Support:	Jennifer Buel	JB			Chuck Sorden	CS	X

Subcontractor:			Onsite				Onsite
John Zwahl	American Waste Mgmt Srv	JZ	X				
Robert Hazen	American Waste Mgmt Srv	RH	X				
Asphalt Crew	J.H. Villeneuve & Sons		X				

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM	X	Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	AM and CS mobilized to LC39A.
7:30	Stop for ice.
7:45	
8:00	AM and CS onsite. Tailgate - Discussed heavy equipment safety, proper hydration, proper PPE.
8:15	AM prepares figures for utility clearance and T&D subcontractor. CS attempts to repair generator.
8:25	Utility clearance. RO and JM onsite. AM and CS show them areas to be cleared.
8:45	
9:00	AM and CS back at trailer. Prepare figure for T&D sub and set up cones for road closure for asphalt placement.
9:10	RL onsite.
9:25	Unable to repair generator. CS offsite to get another generator.
9:40	
10:00	
10:15	
10:30	CS returns to site. Asphalt subcontractor personnel onsite and begin placing asphalt. AM, CS, and RL begin mounting
10:45	cabinets on concrete pads.
11:00	
11:10	
11:30	John Zwahl (JZ) and Robert Hazen (RH) of American Waste Management Services onsite. AM shows them the
11:45	proposed excavation locations.
12:00	CS and RL lunch
12:30	JZ and RH offsite. AM lunch.
12:45	
12:55	
13:00	AM, CS, and RL resume mounting cabinets.
13:45	
14:00	
14:15	
14:30	AM submits requisition for heavy equipment rental from Ring Power.
15:00	Discontinue work due to heavy storms overhead.
15:10	Phase II. Asphalt sub offsite.
15:15	RL offsite.
15:30	AM and CS offsite.
16:00	
16:15	
16:30	
17:00	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 43 -- 61 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	18-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN		Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	
7:45	
8:00	AM and CS onsite. Conduct morning meeting.
8:15	
8:30	Continue mounting cabinets.
8:45	
9:00	RL onsite.
9:15	
9:30	
9:40	
10:00	
10:15	
10:30	
10:45	
11:00	
11:10	
11:30	RL offsite to assist SV.
11:45	
12:00	Lunch
12:30	Resume mounting cabinets.
12:45	
12:55	
13:00	
13:30	Discontinue work due to heavy rains.
14:00	Resume mounting cabinets.
14:15	
14:30	
15:00	
15:15	
15:30	
15:45	
16:00	
16:15	Mounting cabinets complete. Housekeeping.
16:30	AM and CS offsite.
17:00	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 43 -- 61 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	19-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	X
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	AM onsite. Begins picking up form boards.
7:45	
8:00	CS onsite.
8:15	
8:30	SV onsite to pick up air sparge parts.
8:45	WC and EW onsite. Begin prepping for pipe rack construction at AS trailer location. SV offsite.
9:00	EW offsite to escort straw wattle delivery to site.
9:20	Watkins Oil onsite to fuel equipment.
9:30	RL onsite.
9:50	EW returns escorting delivery.
10:00	
10:15	
10:30	
10:45	
11:00	
11:10	
11:20	
11:45	
12:00	Lunch. CS offsite to take PPE to CN for meeting at Wilsons Corner.
12:30	CS returns.
12:45	
12:55	
13:00	
13:45	
14:00	CN and MD to 39A to walk proposed excavations.
14:15	
14:30	
15:00	
15:15	
15:30	
15:45	
16:00	CN drops MD at office.
16:15	
16:30	CN offsite.
17:00	
17:20	
17:30	
18:00	

Comments:

Temperature Range: 43 -- 61 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	20-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH	X	Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	CN to site.
7:45	
8:00	CN, AM, CS, EW, WC, RL onsite. Tailgate. Only one excavator delivered yesterday by CAT; replan day.
8:15	
8:30	
8:45	
9:00	RL to LC-34 for meeting with CH and SV. WC offsite for load of backfill. EW receiving second excavator from CAT.
9:10	CN on mini excavator loading pallet of silt socks onto lift gate of pickup truck.
9:15	CN, AM, CS staging silt socks at varous excavation areas.
9:40	
10:00	
10:15	
10:30	WC returns and parks dump truck with load of backfill at soil excavation Area 38 and assists CN, AM and CS.
10:45	
11:00	WC begins excavating and stockpiling Area 4 on Area footprint. CN, AM, CS setting up laser level and checking
11:10	groundwater elevations in a monitoring well near Area 39 (laser will not work).
11:30	RL leaving LC34 and dropping plywood, T-posts, and batteries at 39A and then to 516 to assist SV.
11:45	
12:00	Lunch
12:30	WC resumes with CN, AM, and CS checking grade and hand excavating.
12:45	
12:55	
13:00	
13:45	
14:00	
14:15	CH onsite. EW call to CAT for ETA of Articulated Dump Truck. Delivery truck broke down.
14:30	CH touring site with CN. EW offsite.
15:00	CN and AM resume staging silt socks.
15:15	
15:30	
15:45	
16:00	WC and CS offsite.
16:15	AM offsite.
16:30	
17:00	
17:15	CN and CH offsite.
17:30	
18:00	

Comments:

Temperature Range: 43 -- 61 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	21-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

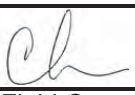
Time	
6:30	
7:00	
7:30	CN to site.
7:45	
8:00	CN, AM, CS, RL, EW, WC onsite. Tailgate.
8:15	EW tracking excavator from Area 34 to Area 38. CS and AM setting up new laser level. CN showing WC Areas 10, 12,
8:30	and 13.
8:45	
9:00	RL placing clean backfill berm at north end of Area 38. CN, WC, and AM placing plywood at culvert entrance from
9:10	Area 39 to Area 38 and setting up pump at culvert outfall to pump free standing water downstream of Area 38 through
9:15	silt sock. EW receiving articulated truck.
9:30	CN and CS shoot water elevations in Area 39 (6 inches higher than groundwater in nearby well at 4.1 bgs). Tailgate of
10:00	truck is bent and two orifices in bed need plugged. CS seals orifices with silicone caulking.
10:15	
10:30	RL loading remaining backfill in articulated truck for EW to transfer to Area 39 (attempt to bend tailgate with excavator)
10:45	
11:00	CS offsite for supplies.
11:10	
11:30	
11:45	
12:00	Lunch.
12:30	Attempts to seal tailgate to no avail.
12:45	
12:55	
13:00	CS returns.
13:45	
14:00	
14:15	
14:30	
15:00	Remove plywood and allow water to pass for weekend; will do it again Monday while truck is being serviced.
15:15	
15:30	
15:45	
16:00	All offsite.
16:15	
16:30	
17:00	
17:15	
17:30	
18:00	

Comments:

Temperature Range: 55 -- 75 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	24-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X		Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP			Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH			Randy Keyser	RK	
Project Support:	Jennifer Buel	JB			Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM	X	Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	CN and WC onsite. WC refuels pump and replaces clean earthen berm north of Area 38.
7:45	
8:00	RL onsite. Tracks excavator from Area 38 to 39.
8:15	
8:30	Two trucks begin delivering backfill; two loads staged at Area 38.
8:45	EW onsite with CAT mechanic. Welding angle iron on articulated truck tailgate to hold plywood. Dig Police onsite to
8:55	resume marking utilities in Areas 10, 12, 13 and 34.
9:00	EW on mini excavating 6-inches from Area 41 and placing in swale of Area 39.
9:15	
9:30	AM and CS onsite from Vaccon tutorial at CAT in Palm Bay. CN discusses waterline repair project with Mike of
9:55	SpaceX to occur within Area between 40 and 43.
10:00	RL excavating Area 39 and loading articulated truck. EW dumping in Area 34. CN spotting at dump. WC pre-
10:30	excavating and stockpiling Area 10 within footprint.
10:45	
11:00	
11:10	
11:30	
11:45	
12:00	
12:30	Lunch.
12:45	
12:55	
13:00	All resume. AM hand digging utilities for WC and spotting.
13:45	
14:00	EW call to CAT for Vaccon ETA; they will not mobilize until insurance information received. Call to Russ Murphy to
14:15	forward insurance information to CAT.
14:30	
15:00	
15:15	
15:30	
15:45	
16:00	
16:15	Area 39 excavation roughly half way complete; 16 loads of backfill received, Area 10 pre-excavated, Area 12 pre-
16:30	excavation begun. All offsite.
17:00	
17:15	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	16	16
--	Topsoil:	0	0

Temperature Range: 72 -- 86 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	25-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X		Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP			Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH			Randy Keyser	RK	
Project Support:	Jennifer Buel	JB			Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	CN stop for ice (already Phase II). Severe rains overnight and continuing this morning.
6:20	CN calls off backfill trucks.
6:30	CN onsite at 39A. Texted EW to stop for filter and oil for trailer generator. Texted AM to stop at Home Depot for
6:40	unistrut, bolts, nuts and washers. Texted WC to bring sawzaw.
6:45	CN troubleshooting trailer generator and looking up diagnostic codes in manual.
7:30	WC and CS onsite.
8:00	Trailer powered.
8:15	EW onsite. EW and CS housekeeping. CN and WC tour excavations and inspect erosion and sediment controls.
8:40	Area 38 silt sock needs restaked.
8:45	RL onsite. Walks Area 39 with CN and WC.
9:15	AM onsite. Tailgate.
9:30	Phase II cancelled. EW erecting assemblies to split 2-inch HDPE to two 1-inch lines. RL and WC setup table saw to
9:40	cut unistrut. CN and AM measure cabinets.
9:45	RL and WC cutting unistruts, CS drilling holes in unistrut, AM mounting in cabinets.
10:30	
10:45	
11:00	
11:10	
11:30	
11:45	
12:00	Lunch.
12:30	All resume.
12:45	
12:55	
13:00	
13:45	
14:00	
14:15	
14:30	
15:00	Load 4x4 with tools and supplies to drill backs of cabinet and install bulkheads.
15:15	
15:30	Phase II issued. Housekeeping.
15:45	
16:00	All offsite. CN stop at ACE for more bolts, nuts, washers and 1-inch deep well socket.
16:15	
16:30	
17:00	
17:15	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	0	16
--	Topsoil:	0	0

Temperature Range: 69 -- 78 ^{0} F

Weather Conditions: Thunderstorms

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	26-Nov
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
7:00	
7:30	CN stop for ice then at LC-34 to pick up trailer.
8:00	AM and CS onsite at LC-39A. Housekeeping.
8:15	CN onsite at LC-39A; loading mini excavator onto trailer.
8:35	
8:45	CN transport mini excavator to LC-34. WC onsite at LC-39A. EW onsite at LC-34.
9:00	WC, AM, and CS drilling holes in cabinets and installing bulkheads.
9:15	CN at LC-34. EW offloads mini excavator and unhitches trailer. CN instructs EW to remove 6-inch material from
9:30	within trench to 16B in concrete area to prep for concrete replacement.
9:45	CN call with Mark Jonnet.
10:00	
10:15	
10:30	
10:45	CN call with MD to discuss progress.
11:00	
11:15	
11:20	
11:30	CN to LC-39A.
12:00	CN onsite at LC-39A. Lunch. WC offsite.
12:30	
12:45	
12:55	
13:00	WC returns to site. CN and WC resume drilling and installing bulkheads and shop-vacing cabinet interiors and pads.
13:45	
14:00	
14:15	
14:30	
15:00	AM and CS assisting CN and WC.
15:15	
15:30	
15:45	CS offsite.
16:00	All offsite.
16:15	
16:30	
17:00	
17:15	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	0	16
--	Topsoil:	0	0

Temperature Range: 50 -- 72 ^{0} F

Weather Conditions: Thunderstorms



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	1-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
7:00	
7:30	CN stop for ice.
7:45	CN onsite at LC-34 hitching up trailer.
8:00	RL onsite at LC-34 loading mini excavator onto trailer. CS, WC, EW onsite at LC-39A.
8:15	CN and RL collecting road barricades and storing in 3-sided building. CS and WC repairing silt sock north of Area 38
8:20	and adding a second and restarting pump. EW repainting utilities in Areas 36, 35 and 12.
8:30	CN and RL rehang project sign on perimeter fence.
8:45	CN offsite to LC-39A.
9:00	CN onsite. Tailgate.
9:15	WC resumes excavating Area 12. RL onsite; begins placing backfill and shaping swale in upgradient portion of Area
10:00	39 awaiting water to pump down.
10:00	CAT mobilizes skid steer.
10:30	RL resumes excavating Area 39 and loading into articulated truck. EW driving articulated truck, dumping loads in Area
10:45	35 with CS spotting for utilities.
11:00	
11:15	
11:20	
11:30	
12:00	Lunch.
12:30	All resume.
12:45	
12:55	
13:00	
13:45	
14:00	
14:15	
14:30	WC completes excavation of Area 12, gets on skid steer and begins moving backfill from edge of Area 39, east side of
14:40	swale for excavator to walk edge of excavation.
14:45	RL completes south (upgradient) portion of Area 39. CS decons bucket, and RL begins backfilling and shaping swale
14:50	with excavator. WC on skid crowding backfill to RL.
15:00	CS and EW offsite to badging office to retrieve Vaccon from CAT.
16:00	All offsite.
16:15	
16:30	
17:00	
17:15	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	0	16
--	Topsoil:	0	0

Temperature Range: 57 -- 79 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	2-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X		Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM			Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP			Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH			Randy Keyser	RK	
Project Support:	Jennifer Buel	JB			Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
7:00	
7:15	CN stop for ice.
7:45	CN onsite. Escort topsoil delivery truck to stockpile location (one truck already there).
8:00	CS, RL, WC, EW onsite. Tailgate.
8:15	WC on skid steer placing backfill on berm north of Area 38. CN fueling and starting pump. CS plumbing vac truck to
8:20	fill water tanks. RL on excavator placing backfill in Area 39 and shaping swale. RL placing excess backfill into WC's
8:30	dump truck to transfer to north side of utility rack for Area 39. EW in articulated truck on standby.
9:00	
9:30	RL loading spoils of material removed from concrete swale and left by others into the articulated truck. CN on mini
9:40	excavator assisting RL.
9:45	MD onsite. WC on mini excavator. CN discusses project status with MD.
10:00	
10:30	CS staging vac truck near utility rack. CN assisting CS with setup.
10:45	MD offsite. CN and CS vac beneath utility rack (very sloppy conditions - too much water and hose not manageable.
11:00	
11:15	
11:20	
11:30	WC on mini excavator excavating beneath utility rack. CN and CS try vac on Area 41 (less water) but hose still not
12:00	manageable. EW orders flex hose from CAT.
12:15	Lunch.
12:45	WC on mini excavating beneath utility rack. RL excavating north end of Area 39, EW transporting.
12:55	
13:00	
13:45	
14:00	Rains start. CN calls off topsoil trucks and waits for last two. CS pot holing Area 13 utility markings for depth with vac
14:10	
14:15	
14:40	
14:45	
14:50	
15:00	
16:00	
16:15	All offsite. CN stop at LC34 trailer for PVC fittings for VAC truck hose; CAT won't have proper fitting until Friday.
16:30	
17:00	
17:15	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	0	16
--	Topsoil:	16	16

Temperature Range: 64 -- 79 ^{0} F

Weather Conditions: Rain

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	3-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
7:00	CN stop for ice.
7:30	CN onsite at 39A. Waiting at 39A gate for backfill trucks to lead them to dump location. WC onsite; refueling and
7:45	starting pump at Area 38.
8:00	EW onsite. Replaces CN. CN to meet with Jose Espinoza of SpaceX electrical group regarding electrical conduit to
8:15	building. RL onsite; preparing to resume excavating Area 38.
8:30	CS onsite. Greasing vaccon. WC on mini excavating beneath utility rack at Area 38 and placing within reach of
8:50	excavator.
9:00	No backfill trucks today. EW on articulated truck. RL resumes excavating. CN, WC, and CS potholing utilities at Area
9:30	12 to check depths.
9:40	
9:45	
10:00	
10:30	
10:45	
11:00	Vaccon overheated. WC begins excavating and stockpiling Area 12 with CS spotting. CAT called for service.
11:15	
11:20	
11:45	Lunch.
12:00	
12:15	All resume.
12:45	
13:00	
13:30	CN call for backfill trucks - not today.
13:45	
14:00	RL completes Area 39 and following decon of bucket; begins placing backfill along edge to shore up exposed water
14:10	line. EW on skid steer pushing backfill to RL. CAT onsite working on vaccon.
14:15	
14:40	
14:45	
14:50	
15:00	CAT offiste. CS dumping vaccon at Area 34 and CN assisting.
15:30	CS resumes potholing Area 12. CN, RL, and EW placing T-posts and rope barricades at Area 12.
16:00	All off-site.
16:30	
17:00	
17:15	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	0	16
--	Topsoil:	0	16

Temperature Range: 61 -- 79 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	4-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM	X	Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	CN stop for ice.
6:45	CN onsite calculating excavation quantities and backfill/topsoil quantities.
7:15	WC onsite.
7:30	CN escorts backfill truck to Area 39. CN escorts second truck.
8:00	RL, EW, CS onsite. Tailgate.
8:15	RL placing backfill in Area 39 and shaping surface. WC on skid steer grading backfill stockpile area. CS greasing
8:20	vaccon.
8:30	MD onsite for tour.
9:00	CS potholing utilities in Area 13.
9:30	
9:40	
9:45	
10:00	MD offsite. EW on articulated truck transporting soil from Area 13 to Area 12 stockpile loaded by WC.
10:30	
10:45	
11:00	
11:15	
11:20	
11:45	
12:00	Lunch
12:15	CN to 39B to show surveyors 5 excavation areas. EW, WC, CS resume. RL pumping free water from Area 38 to prep
12:45	for excavation.
13:00	
13:30	
13:45	
14:00	EW to Area 38; transporting loads to Area 34 stockpile.
14:10	
14:15	
14:30	Vaccon out of fuel. CN and CS hand digging utilities and spotting for WC.
14:45	
14:50	
15:00	
15:30	
16:00	All off-site.
16:30	
17:00	
17:15	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	14	30
--	Topsoil:	0	16

Temperature Range: 62 -- 79 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	5-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X		Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM			Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP			Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH			Randy Keyser	RK	
Project Support:	Jennifer Buel	JB			Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	CN stop for ice.
6:30	CN onsite.
6:40	MD onsite.
7:15	
7:30	WC and RL onsite. WC to Area 13 to direct first backfill dump and resume excavation. RL starting pump at Area 38.
8:00	EW onsite and transports articulated truck to Area 13 for WC to load soil for staging in Area 12. CS onsite greasing
8:05	vaccon.
8:10	MD offsite. CN checks on Area 13.
8:30	CN painting boundaries of recently released 11 excavation areas. Meet RO at Area 19.
9:00	
9:30	
9:40	
9:45	
10:00	
10:30	Pump on vaccon won't start; call for service. EW in articulated truck to Area 38 to be loaded by RL, transport to Area
10:45	34.
11:00	
11:15	
11:20	
11:45	
12:00	CN spotting two loads of backfill.
12:15	
12:30	Lunch.
13:00	RL and EW resume at Area 38. WC and CS resume at Area 13.
13:30	
13:45	
14:00	CAT onsite to repair vaccon pump.
14:10	
14:15	
14:30	CS resumes vacuuming in Area 13. RL completes Area 38, decons bucket and begins placing backfill and shaping
14:45	swale. EW to Area 13. CN stops backfill trucks for the day.
14:50	
15:00	
15:30	
16:00	All off-site.
16:30	
17:00	
17:15	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	14	44
--	Topsoil:	0	16

Temperature Range: 66 -- 77 ^{0} F

Weather Conditions: Rain



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	8-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	
6:30	
6:40	
7:15	CN stop for ice.
7:30	CN and WC onsite. WC waiting at gate to escort topsoil delivery truck.
8:00	EW, CS, and AM onsite. WC dumping two loads of topsoil into stockpile at Area 34.
8:15	RL onsite. Tailgate.
8:30	AM collecting dioxin soil samples. CS resumes vacuuming Area 13. WC on excavator loading Area 13 soil into
8:45	articulated truck dumping loads in Area 12. RL on excavator shaping and grading backfill in Area 38.
9:00	
9:30	
9:40	
9:45	
10:00	RL tracks excavator to Area 28. EW takes articulated truck to Area 28 for RL to load.
10:30	
10:45	
11:00	
11:15	
11:20	
11:45	CS takes vac truck offsite for fuel at industrial area.
12:00	Lunch.
12:15	
12:30	CS and WC resume in Area 13. RL tracks excavator to Area 36 and reviews excavation with CN. EW dumping load
12:50	from Area 28 in Area 34 stockpile. Rains begin.
13:00	EW back to Area 13.
13:45	
14:00	
14:10	
14:15	
14:30	
14:45	
14:50	
15:00	
15:30	WC and CS offsite.
15:45	EW and RL offsite.
16:15	CN offsite. AM collecting last sample
16:45	Mark Jonnet (MJ) call to CN; stuck at CCB. CN returns get skid steer and trailer to pull MJ out.
17:15	
17:30	
18:45	CN and MJ offsite.

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	0	44
--	Topsoil:	4	20

Temperature Range: 60 -- 73 ^{0} F

Weather Conditions: Rain



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	9-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	
6:30	
6:40	
7:15	CN stop for ice.
7:30	CN and WC onsite. WC stopped at CCB for skid steer and trailer. CS going through CCAFS inspection.
7:45	AM onsite.
8:00	EW onsite. Tailgate.
8:15	AM resumes collecting dioxin samples. EW and WC to Area 13 to resume when CS arrives.
8:30	CS arrives and resumes vacuuming Area 13.
9:00	RL onsite. Resumes excavating Area 36 and stockpiling.
9:30	
9:40	
9:45	
10:00	
10:30	AM assisting CS.
10:45	
11:00	
11:15	
11:20	
11:45	
12:00	AM collecting TCLP sample from Area 7 roll-off box and offsite to meet courier.
12:15	
12:30	All resume.
12:50	
13:00	Mark Jonnet (MJ) and MD onsite to discuss sampling at Area 42. CS offsite for supplies.
13:45	
14:00	
14:10	
14:15	
14:30	
14:45	
14:50	
15:00	MD and MJ offsite. CS returns, hitches trailer and loads 4x4 offsite to LC-34. Area 13 excavation complete. CN
15:30	instructs RL on excavation of Area 34. RL begins excavation.
15:45	
16:00	RL, EW, and WC offsite.
16:30	CN and AM offsite following call with JB.
17:15	
17:30	
18:45	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	0	44
--	Topsoil:	0	20

Temperature Range: -- ^{0} F

Weather Conditions:

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	10-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	
6:30	
6:40	
7:15	CN stop for ice.
7:30	CN stop at LC34 for bottleware and to pick up vac truck remote from CS.
7:45	CN, RL and WC onsite at LC-39.
8:00	EW onsite. Tailgate.
8:15	WC on excavator placing backfill in Area 13. RL in excavator resumes excavating Area 34. EW on skid steer placing
8:30	topsoil in Area 41. AM onsite prepping cart for sampling Area 42 today.
8:45	CN and AM preparing to vac beneath utility rack at Area 42 to depth of 6-inches.
9:00	Mark Jonnet (MJ) onsite briefly.
9:15	CN and AM attaching flange adaptor to flex hose for vac truck.
9:45	CN and AM vacuuming Area 41.
10:00	
10:30	
10:45	
11:00	
11:15	
11:20	
11:45	
12:00	Lunch
12:15	
12:30	AM collecting samples in Area 42 for PCBs. RL assisting CN vacuuming Area 41. EW on mini excavator excavating
12:50	and stockpiling 6-inches from Area 17.
13:00	
13:45	
14:00	
14:10	
14:30	
15:00	
15:15	CN and RL complete Area 41 and dump vac truck in Area 34.
15:30	Notified by SpaceX personnel that pad needs cleared of all personnel by 4 PM for test pressurization. RL offsite.
15:40	AM offsite. CN informed WC and EW who had just completed Area 17.
15:50	EW and WC offsite.
16:00	CN offsite. Call with JB regarding T&D, trucker badging and 39B excavations.
16:15	
16:30	
17:15	
17:30	
18:45	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	0	44
--	Topsoil:	0	20

Temperature Range: 44 -- 61 ^{0} F

Weather Conditions: Hazy/Fog

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	11-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Randy Keyser	RK	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	
6:30	
6:40	
7:15	CN stop for ice.
7:30	
7:45	CN onsite.
8:00	EW and WC onsite. Tailgate
8:15	AM onsite prepping to sample Area 42. CN spotting two topsoil delivery trucks at Area 12. WC on excavator and EW
8:30	in articulated truck transfers Area 17 soils to Area 19 (6-inches).
8:45	RL onsite. CN and RL prep to vac beneath rack at Area 17 (depth of 6-inches).
9:00	
9:15	
9:30	WC excavating Area 18 (6-inches) into articulated truck for transport to Area 19. CN and RL vac Area 17.
10:00	
10:30	
10:45	
11:00	
11:15	
11:20	
11:45	
12:00	Lunch
12:15	
12:30	RL resumes. CN, WC, and EW walk down Areas 23 and 24.
12:50	
13:00	WC transports excavator to Area 23 to excavate 2-ft into articulated truck for transport to Area 25.
13:45	
14:00	
14:10	
14:30	
15:00	
15:15	
15:30	
15:40	
15:50	
16:00	All offsite. CN off to get supplies.
16:15	
16:30	
17:15	
17:30	
18:45	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	0	44
--	Topsoil:	14	34

Temperature Range: 44 -- 62 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	12-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	
6:30	
6:40	
7:15	CN stop for ice.
7:30	
7:45	CN, WC, RL onsite.
8:00	EW and AM onsite. Tailgate.
8:15	RL and AM resume vacuuming Area 17 beneath rack. WC on excavator loading last 1/2 load from Area 23 into
8:30	articulated truck for EW to transfer to Area 19.
8:45	
9:00	WC begins excavating trench spoils from Area 31 and loading into articulated truck.
9:15	RL on mini excavator crowding trench spoils to WC. CN and AM constructing stone spreader in trench adjacent to the
9:30	air sparge trailer pipe rack for AC condensate discharge.
10:00	
10:30	
10:45	
11:00	
11:30	CS and MM onsite. CN shows MM around and Identifies monitoring wells for weekend sampling.
11:20	
11:45	
12:00	Lunch
12:15	
12:30	WC excavating and stockpiling 2-ft from Area 24. MM calibrating instruments. RL on excavator excavating 1-foot of
12:50	soil from Areas 35 into articulated truck for EW to transport to other side of Area 35 where stockpile is located. AM
13:00	and CS vacuuming 1-foot of soil from Area 31.
13:45	
14:00	CN call to MD to provide project status and discuss 39B schedule (not until at least second week of January).
14:10	
14:30	
15:00	
15:15	
15:30	
15:40	
15:50	
16:00	All offsite.
16:15	
16:30	
17:15	
17:30	
18:45	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	0	44
--	Topsoil:	0	34

Temperature Range: 46 -- 63 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	15-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH	X	Mark Mengel	MM	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	
6:30	
6:40	
7:15	CN stop for ice.
7:30	
7:45	CN and MM onsite.
8:00	EW, WC, CS, AM onsite. Tailgate.
8:15	WC on excavator loading 6-inch excavation from Area 25 into dump truck and transferring to Area 19 stockpile. Two
8:17	backfill trucks onsite, dump backfill into Area 23. AM collecting GPS points for sample locations in Area 42. CS
8:19	resumes vacuuming 1-foot of soils in Area 31. EW on articulated truck resumes transporting Area 34 soils from north
8:25	and east sides to stockpile on southwest portion of Area. RL onsite on excavator loading EW's truck. MM resumes
8:27	sampling monitoring wells.
8:30	CH onsite. Reviews locations of parts and tools to resume installing manifolds in air sparge cabinets with CN.
9:00	CH installing manifold blocks in Area D cabinet.
10:00	MM assisting CS.
10:45	
11:00	AM assisting CS and MM.
11:30	
11:20	
11:45	
12:00	WC completes excavating and transporting Area 25 soils (last half load to Area 35). Lunch.
12:15	
12:30	RL and EW resume in Area 34. CS and AM resume in Area 31. WC moves excavator to Area 35 and begins
12:50	excavating 1 foot of soil into dump truck to transfer to outer edge of Area.
13:00	
13:45	
14:00	CN calls to MD and JB to discuss badging.
14:10	
14:30	
15:00	
15:15	
15:30	
15:40	
15:50	
16:00	All offsite.
16:15	
16:30	
17:15	
17:30	
18:45	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	16	60
--	Topsoil:	0	34

Temperature Range: 41 -- 69 ^{0} F

Weather Conditions: Sunny/Clear

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	16-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH	X	Mark Mengel	MM	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	
6:30	
6:40	
7:15	
7:30	CN stop for ice.
7:45	
8:00	CN, EW, AM, CS, WC, MM onsite. Tailgate
8:15	CH and RL onsite.
8:30	RL and EW resume in Area 34. WC resumes in Area 35. AM and CS resume in Area 31 with CN on mini excavator
8:45	loosening material for vac truck. CH and MM resume drilling and setting up cabinets in Areas E/F. One truck
9:00	delivering backfill material.
9:15	
9:30	
9:45	
10:00	Vac truck stopped in Area 31 due to SpaceX pressurizing nearby system.
10:30	Watkins Oil onsite fueling equipment. EW backed articulated truck into excavator arm and bent a steel fitting on a
10:45	hydraulic line. CAT called for repair.
11:00	RL assisting AM and CS and CN.
11:20	
11:45	
12:00	
12:15	
12:30	Lunch. CAT mechanic onsite.
12:50	
13:00	AM, CS, RL and WC resume.
13:30	EW reports that part is ordered for tomorrow morning. EW offsite.
14:00	
14:15	CN offsite to badging office to verify truck drivers are badged.
14:45	Call to Bobby Lochmueller at Soil Tech. All 13 truck drivers badged; aliens and naturalized citizens must have
15:00	paperwork with IDs.
15:15	CN returns to site. WC moves excavator to Area 36 to prepare for T&D loading. Vacuum won't dump.
15:30	
15:45	RL spotting last backfill load of the day.
15:50	
16:00	WL, RL, CS, AM offsite. MM tracks mini to Area 13. CN, CH, and MM open vac clam and remove some material; still
16:15	won't dump.
16:30	
17:15	
17:30	CN, CH, MM offsite.
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	8	68
--	Topsoil:	0	16

Temperature Range: 42 -- 73 ^{0} F

Weather Conditions: Hazy/Fog

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	17-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH	X	Mark Mengel	MM	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

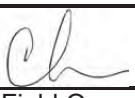
Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	
6:30	
6:40	
7:00	CN and WC onsite. AM at badging station to escort truckers. WC prepping to load trucks at Area 36. CN prepping to
7:15	manifest.
7:45	
8:00	AM escorts two trucks to site. RL onsite spotting trucks. CAT mechanic onsite to replace hydraulic fitting on RL's
8:15	excavator. CS onsite. CS and AM cleaning up vac truck and CS on mini excavator creating dump area for vac truck
8:30	in Area 12 stockpile. MM housekeeping job trailer.
8:45	
9:00	CAT mechanic working on vac dump (won't lift). RL offsite to assist SV at Area 516.
9:15	
9:30	
9:45	
10:00	AM and CS flushing vac with water to clean out; dump water at Area 12 stockpile. MD onsite. MM and CH installing
10:30	flex lines to cabinets from air sparge lines. RL returns and resumes excavating and stockpiling Area 34. EW on skid
10:45	steer placing topsoil in Area 25.
11:00	
11:20	
11:45	
12:00	Second round of trucks arrive at site. CS and AM resume vacuuming Area 31 and electric trench for trailer.
12:15	
12:30	
12:50	
13:00	Lunch.
13:30	EW offsite to CCB to meet air conditioner repairman.
14:00	EW returns. WC loading last of Area 36 into articulated truck for EW to dump at Area 35.
14:15	
14:45	
15:00	WC moves excavator to resume stockpiling Area 35. EW on skid steer in Area 25.
15:15	
15:30	
15:40	Two trucks return to site. RL loading at Area 34. CH and MM installing 1-inch flex hose and 2-inch to 1-inch tees at
15:50	Area A and C cabinets. CS and AM dump and flush vac at Area 12.
16:00	WC and EW offsite.
16:15	
16:30	RL, AM, CS offsite.
16:45	CH and MM offsite.
17:00	CN offsite.
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	12	12
--	Backfill:	0	68
--	Topsoil:	0	16

Temperature Range: 51 -- 71 ^{0} F

Weather Conditions: Sunny/Clear



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	18-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH	X	Mark Mengel	MM	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	
6:30	
6:45	CN stop for ice
7:00	CN onsite. WC loading 3 trucks from Area 34. CN manifesting.
7:10	RL onsite.
7:30	EW onsite. EW on skid steer resumes spreading topsoil in Area 25. WC tracking excavator from Area 35 to Area 6.
7:45	AM onsite. Taking vac to NASA Industrial Area to fuel truck. CS onsite from stopping at store to exchange hole saws.
7:55	
8:00	MM and CH onsite and resume installing 2-inch to 1-inch tees and 1-inch flex hose into cabinets.
8:30	AM returns. CS and AM vacuuming 6-inch from Areas 33 and 32.
9:00	
9:15	
9:30	EW transferring Area 6 soil to Area 34. Three trucks at badging; 1 turned away. Call to Bobby Lochmueller to find out
9:45	why; Driver was 1 of 14 but not 1 of 13 approved since no naturalization provided (from call with JB). CN informed Clif
10:00	Depillo of AMWS.
10:15	EW assisting CN with manifesting and leading new driver to Area 34. WC loading from Area 3, then 4.
10:45	
11:00	AM and CS complete vacuuming Areas 32 and 33 and begin Area 34.
11:15	
11:45	
12:00	WC gathering remainder from Areas 3 and 4 and stockpiling in Area 2. RL on skid steer placing backfill in Area 36
12:15	
12:30	
12:50	
13:00	
13:30	
14:00	
14:15	CS offsite.
14:45	
15:00	CH and MM complete cabinets and begin connecting steel pipe for 4 air sparge wells located across the concrete
15:15	flume in Area E.
15:30	
15:40	
15:50	
16:00	MM, CH, RL, WC, EW offsite.
16:15	
16:30	AM flushing vac with water and relocating to Area 2. CN call with MD.
16:45	
17:00	CN offsite.
18:00	

Comments:	Trucking Totals:	Today	Cumulative
-- 13 loads of T&D today (8 in Area 34, 2.5 in Area 4, 1.5 in	Disposal:	13	25
Area 3 and 1 in Area 2).	Backfill:	8	76
--	Topsoil:	0	34

Temperature Range: 46 -- 67 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	19-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	
6:30	
6:45	CN stop for ice
7:00	CN onsite. WC loading truck at Area 34. CN manifesting. RL onsite.
7:10	
7:30	RL takes over loading at Area 34. EW onsite. EW and WC unloading skid steer from trailer, attaching bucket and EW
7:45	driving it to Areas 6, 4, and 3 to place backfill.
8:00	One backfill truck begins deliveries. AM onsite; dumping vaccon in Area 2.
8:15	
8:30	EW on skid steer pushing backfill in Area 36.
8:50	RL offsite to assist SV.
9:15	EW on skid steer placing topsoil in Area 6. AM filling vaccon water tanks.
9:30	
9:45	
10:00	EW on skid steer placing backfill in Area 36. AM resumes vacuuming 1-ft in Area 34 around panel near sediment
10:15	pond.
10:30	WC goes to Area 34 to load trucks. EW tracking excavator from Area 2 to Area 12.
11:00	
11:15	
11:30	RL returns to site. WC to Area 12 to load trucks.
12:00	Lunch (RL, EW, WC).
12:15	
12:30	WC loading from Area 12. RL excavating and stockpiling Area 34. EW on skid steer placing backfill in Areas 3 and 4.
12:50	
13:00	
13:30	
14:00	
14:15	
14:30	AM completes vacuuming Area 34 and dumps vac truck at Area 2.
15:00	
15:15	
15:30	
15:40	
15:50	
16:00	RL, WC, EW, AM offsite. CN call with MD.
16:15	
16:30	CN housekeeping. CN informed by security that pad will be closed Wednesday to Sunday next week. CN notifies
16:45	truck company.
17:00	CN offsite.
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	19	44
--	Backfill:	8	84
--	Topsoil:	0	34

Temperature Range: 49 -- 70 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	22-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	
6:30	
6:45	
7:00	CN and WC onsite. Three trucks waiting at Area 12. CN manifesting and WC on excavator loading trucks.
7:10	
7:30	
7:45	RL and EW onsite. RL prepping to load at Area 34. EW prepping to place backfill in Areas 3 and 4 when backfill truck
8:00	arrives. AM onsite; begins housekeeping.
8:05	One backfill truck onsite. CN spots dump of the material in Area 3.
8:45	AM offsite for ice. RL on skid steer placing backfill in Area 36. EW on skid placing backfill in Areas 3 and 4.
8:50	
9:15	
9:30	
9:45	
10:00	EW on articulated truck with RL on excavator. Excavating strip between small building and asphalt along edge of Area
10:15	34. EW dumping material at Area 34 stockpile. AM vacuuming sediments from concrete trough at bottom of pad
10:30	along edge with Areas 2, 3, 4 and 6 excavations.
11:00	
11:15	
11:30	Five trucks arrive at the site. Two trucks are directed to WC at Area 12 and three trucks directed to RL at Area 34.
12:00	
12:15	
12:30	Lunch. Ryan Purdy of NEFF onsite briefly.
12:50	
13:00	WC loading last buckets of Area 12 into articulated truck for EW to transport to Area 34.
13:30	
14:00	RL resumes excavating Area 34 and loading into articulated truck. WC tracks excavator to Area 10.
14:15	
14:30	
15:00	RL completes eastern side of Area 34, EW on skid steer placing backfill in Area. WC loading Area 10 into truck.
15:15	
15:30	
15:40	
15:50	
16:00	AM and EW offsite. RL grading backfill at Area 34.
16:20	WC loading last truck at Area 10.
16:30	
16:45	
17:00	CN, RL, WC offsite.
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	14	58
--	Backfill:	8	92
--	Topsoil:	0	34

Temperature Range: 63 -- 77 ^{0} F

Weather Conditions: Rain

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	23-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	CN at Home Depot for supplies.
6:30	
6:45	CN stop for ice.
7:00	CN onsite. No trucks.
7:05	EW and WC onsite.
7:10	RL onsite. Truck arrives. RL loading truck at Area 34. WC on excavator loading last buckets from Area 10 into
7:25	articulated truck for EW to transfer to Area 34.
7:30	Watkins onsite to fuel equipment.
8:00	AM onsite and resumes vacuuming concrete curb along Areas 2, 3, 4 and 6.
8:20	One truck delivers topsoil to Area 36. RL on skid steer grading topsoil.
8:30	WC loading Area 24 into articulated truck for EW to transfer to Area 34 between loading trucks.
9:15	
9:30	
9:45	
10:00	
10:15	
10:30	
11:00	WC can no longer load trucks due to lack of reach of the excavator. WC continues loading articulated truck for
11:15	transfer to Area 34. RL loading trucks at Area 34 and keeping dump area clean for EW.
11:30	
12:00	EW and WC lunch.
12:15	
12:30	EW and WC resume. CN manifesting and directing backfill/topsoil trucks.
12:50	
13:00	
13:30	
14:00	
14:15	
14:30	WC completes excavation of Area 24 and tracks excavator to Area 19. CN calls SoilTech because only two of the six
14:45	expected trucks showed up today.
15:00	EW tracking WC's excavator to Area 5. WC on skid steer grading backfill in Area 4. CN placing silt socks at soil pile
15:30	in Areas 4 and 19 and bordering spread topsoil in Area 36.
15:40	Last two trucks arrive. RL loading.
15:50	
16:00	EW and WC offsite.
16:20	Trucks depart.
16:30	AM offsite.
16:45	
17:00	CN and RL offsite.
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	14	72
--	Backfill:	3	95
--	Topsoil:	5	39

Temperature Range: 64 -- 78 ^{0} F

Weather Conditions: Mostly Sunny/Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	24-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
7:00	
7:05	
7:10	
7:25	
7:30	
8:00	CN stop for cash for concrete.
8:20	
8:30	CN and WC at concrete yard in Titusville. EW onsite at LC-34. AM picking up work truck at office and stopping at
8:55	electrical supply and Home Depot for supplies.
9:00	Concrete guy is a half hour late. CN call and left voicemail and drove to home of concrete guy.
9:15	Concrete guy is not home. He answered next call and is on his way. RL onsite at LC-34 on Kubota loading RW16B
9:45	core into soil box.
10:00	Concrete guy arrives at yard. Waiting for him to fill hopper with sand and gravel after settling bill (tractor broke down)
10:30	AM onsite. AM and RL prepping for concrete and replacing electrical vault box damaged by asphalt crew.
11:00	
11:15	
11:30	CN on way to site.
12:00	CN onsite. CN, AM and RL pouring concrete in 16B trench (1 cy). EW driving CN's pickup. Thick load, had to hand
12:15	shovel and wash out all.
12:30	WC onsite with second concrete cart assisting others (1 cy).
12:50	
13:00	
13:30	CN cart empty, begin pouring WC's cart (much better mix).
13:55	CN offsite for concrete refill (5/8 cubic yard). Others skreeting trench and setting monitoring well pad form.
14:15	
14:30	
14:45	
15:00	CN returns. AM pouring and finishing concrete.
15:30	
15:40	
15:50	
16:00	
16:20	
16:30	All offsite.
16:45	
17:00	
18:00	

Comments:

Temperature Range: 65 -- 80 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	29-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
7:00	
7:05	
7:10	
7:25	
7:30	CN stop for ice.
7:45	CN stop at LC-34 to pull air stripper out of 3-sided structure for John Oktar of Jacobs.
8:00	RL, EW, AM onsite at LC-39A. EW housekeeping. AM resumes vacuuming concrete curb along Areas 2, 3, 4 and 6.
8:15	RL on skid steer placing topsoil and grading Areas 3 and 4.
8:30	CN onsite. CN and EW install silt sock in tailgate of articulated truck in preparation of excavation of Area 5 which has
9:00	standing water.
9:30	RL on excavator excavating Area 5 to 1-ft bgs loading into articulated truck for EW to transfer to Area 34.
9:45	
10:00	
10:30	
11:00	CN offsite to meet John Oktar of Jacobs to loan him 2 sections of 2-inch lay flat hose.
11:15	
11:30	CN returns to site. AM completes vacuuming sediments from curb and tours other areas needing vacuumed with CN.
12:00	
12:00	Lunch.
12:30	AM vacuuming curb along Area 25. RL and EW resume. CN hand excavating to locate utilities for RL.
12:50	
13:00	
13:30	
13:55	
14:15	
14:30	
14:45	
15:00	Area 5 complete. RL and EW move equipment to complete removal of material from Area 2 for transfer to Area 34.
15:30	
15:40	
15:50	
16:00	RL and EW offsite.
16:20	
16:30	AM offsite. CN investigates area 22 for equipment access.
16:45	
17:00	CN offsite.
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	72
--	Backfill:	0	95
--	Topsoil:	0	39

Temperature Range: 62 -- 81 ^{0} F

Weather Conditions: Hazy/Fog



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	30-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
7:00	
7:05	
7:10	
7:25	
7:30	CN stop for ice.
7:45	
8:00	CN and EW onsite. One truck delivering backfill to Area 24 today. AM stopping at office for work truck. RL working
8:10	with SV at LC-34.
8:15	EW transports 4x4 and excavator from Area 2 to trailer and skid steer from Area 36 to Area 24.
8:45	
9:00	AM onsite; cleaning out vac tank at Area 34.
9:15	
9:45	
10:00	EW on skid steer placing backfill in Area 24. AM begins vacuuming sediments from concrete curb at toe of pad
10:10	adjacent to Area 26.
10:15	
10:50	
11:00	
11:15	
12:00	Lunch.
12:30	All resume.
13:00	
13:30	
13:55	
14:00	Light rains.
14:30	
14:45	
15:00	
15:30	
15:40	
15:50	
16:00	EW and AM offsite. CN calls and texts with WC; Garrido Trucking and RL to arrange backfill deliveries tomorrow and
16:20	movement of excavator to Area 22 (outside perimeter fenceline).
16:40	
16:45	
17:20	CN offsite.
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	72
--	Backfill:	8	103
--	Topsoil:	0	39

Temperature Range: 62 -- 73 ^{0} F

Weather Conditions: Rain

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	31-Dec
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2014
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
7:00	
7:05	
7:10	
7:25	
7:30	CN stop for ice.
7:45	CN onsite.
8:00	EW, WC, AM onsite. Tailgate.
8:15	Two trucks delivering backfill onsite; both dump material in Area 24. EW on skid steer placing backfill in Area 24. CN,
8:30	AM and WC unwrapping visqueen from Area 26 stockpile.
8:45	WC loading Area 26 stockpile into articulated truck. CN and AM hand shoveling to prevent excavator from tearing into
9:10	visqueen beneath stock pile.
9:15	Two more loads of backfill placed into Area 24.
9:45	EW transporting articulated truck to Area 34 to dump. WC tracking excavator to fence perimeter by Area 22. AM
9:40	using vac truck to remove Area 26 stockpile remains and rolling visqueen into ball and placing in contractor bag (added
10:10	to Area 34 stockpile).
10:15	Two loads of backfill dumped by perimeter fence by Area 22. WC using excavator to cast backfill over fence. EW
10:50	resumes placing backfill in Area 24.
11:00	AM transports vac truck to Area 35 to vacuum sediments from concrete swale in center of area.
11:15	Two more backfill loads arrive at the site.
12:00	Lunch
12:30	All resume
13:00	WC on skid placing backfill in Area 2.
13:30	
13:55	
14:00	
14:30	
14:45	
15:00	CN assisting AM dump vac truck in Area 35.
15:30	EW assisting WC relocate skid steer to Area 12.
15:40	
15:50	
16:00	All offsite.
16:20	
16:40	
16:45	
17:20	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	72
--	Backfill:	8	111
--	Topsoil:	0	39

Temperature Range: 64 -- 68 ^{0} F

Weather Conditions: Rain

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	2-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN		Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
7:00	
7:05	
7:10	
7:25	
7:30	
7:45	
8:00	EW onsite.
8:15	EW on skid steer placing topsoil in Area 12.
8:30	
8:45	
9:10	
9:15	
9:45	
9:40	
10:10	
10:15	
10:50	
11:00	
11:15	
12:00	
12:30	
13:00	
13:30	
13:55	
14:00	EW coordinating receipt of long stick excavator from NEFF and placing the excavator and articulated truck outside
14:30	perimeter fence at helipad 8 gate for Area 22 excavation planned for Tuesday.
14:45	
15:00	
15:30	
15:40	
15:50	
16:00	EW offsite.
16:20	
16:40	
16:45	
17:20	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	72
--	Backfill:	0	111
--	Topsoil:	0	39

Temperature Range: 62 -- 76 ^{0} F

Weather Conditions: Rain

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	5-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	CN stop for ice.
6:45	CN onsite. Two trucks waiting as CN arrives. CN preps for manifesting and 2 additional trucks arrive.
7:00	WC and RL onsite. RL begins loading trucks from Area 34 stockpile and CN directs second two trucks to Area 19
7:05	stockpile for WC to load.
7:10	
7:25	
7:30	
7:45	
8:00	EW onsite. EW on skid steer placing topsoil in Area 12.
8:15	One truck delivering backfill onsite; RL directs him to dump at Area 24.
8:30	AM onsite.
8:45	Watkins did not fuel vac truck on Friday; AM offsite to KSC Industrial Area to fuel vac truck. RL on skid steer placing
9:10	backfill in Area 24. WC excavating and stockpiling Area 19.
9:15	
9:45	
9:40	
10:00	AM returns and begins vacuuming 1-ft around utility stanchions.
10:15	
10:50	
11:00	
11:30	RL on skid steer placing backfill in Area 23. CN receives call from Kevin Panik regarding helipad gate access for
11:45	tomorrow. CN to notify SpaceX security when access is needed; a daisy-chain lock was added. EW on skid placing
12:00	topsoil in Area 17.
12:15	Lunch
12:45	AM, WC, EW resume. CN and RL load pump hoses and gasoline in pickup truck and leave site to Area 22.
13:30	RL tracks long stick excavator from helipad 8 road to Area 22 and removes several Brazilian Peppers in route and at
14:00	stream crossing.
14:30	CN returns to site to manifest trucks.
14:45	
15:00	RL asks for NEFF service to be called for long stick excavator (stalling).
15:15	RL offsite to 516 site. EW offsite to meet NEFF mechanic and escort to long stick excavator.
15:30	NEFF onsite.
16:00	EW and WC offsite.
16:30	AM and NEFF offsite.
16:40	
16:45	CN offsite. Received call from Garrido; no backfill or topsoil deliveries tomorrow.
17:20	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	12	84
--	Backfill:	8	119
--	Topsoil:	0	39

Temperature Range: 60 -- 68 ^{0} F

Weather Conditions: Partly Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	6-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	WC onsite loading two trucks at Area 34.
6:50	CN stop for ice.
7:00	CN onsite and manifesting trucks.
7:10	
7:25	
7:30	RL onsite. Long stick excavator is still stalling; call to NEFF for service again.
7:45	
8:00	EW onsite. RL driving articulated truck from area 22 to inside pad near Area 22. EW transporting RL back to Area 22.
8:15	AM onsite and resumes vacuuming Area 35.
8:30	
8:45	
9:00	NEFF mechanic onsite. EW on skid steer placing topsoil in Area 18.
9:30	Roll-off truck arrives onsite to transport roll-off box to OMNI landfill. Driver said a different truck was needed and it was
9:45	under repair; called dispatch to reschedule.
9:40	
10:00	
10:15	CN offsite to meet John Oktar of Jacobs for return of 2-inch hosing.
10:50	
11:00	
11:30	CAT on site to service water guns on vac truck; did not have any parts needed. AM installing rope barricade around
11:45	Area 34.
12:00	Lunch
12:30	RL tries long stick excavator again and begins building berm with clean fill across swale to pump standing water over.
12:45	WC loading Area 19 soil into articulated truck for EW to transport to Area 34. CN investigates revised layout of Area 7
13:00	to determine if vac truck is needed; CN decides it is not needed.
13:30	AM begins decon of vac truck in Area 35.
14:00	Long stick excavator stalling; NEFF called again.
14:30	EW call to CAT for long stick excavator but none available; called vac truck off rental. NEFF onsite. WC loading
14:40	trucks from Area 34.
14:45	RL starting pump at Area 22.
15:30	RL to Area 516 to retrieve 4x4.
15:45	
16:00	WC, RL, EW, AM offsite.
16:30	CN offsite.
16:40	
16:45	
17:20	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	13	97
--	Backfill:	0	119
--	Topsoil:	0	39

Temperature Range: 57 -- 77 ^{0} F

Weather Conditions: Partly Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	7-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP	X	Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB	X	Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM	X	Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	CN stop for ice.
6:45	CN onsite. WC already onsite loading a truck from Area 34. CN manifesting.
6:50	
7:00	
7:10	
7:25	
7:30	RL onsite. CN asked RL to go to Area 22 and test run long stick excavator and re-start pump.
7:45	
8:00	EW and AM onsite. EW transports articulated truck to perimeter fence adjacent to Area 22. AM retrieves short piece
8:15	of silt sock and installs it inside bed of articulated truck against tailgate.
8:30	RL using long stick excavator to build level area with clean fill.
8:45	
9:00	RL excavating Area 22 and loading articulated truck over perimeter fence for EW to transport material to Area 34. AM
9:30	recording measurements to sample locations in Area 42.
9:45	
9:40	
10:00	
10:15	
10:50	
11:00	CP and JB onsite. CN takes them for tour of site. AM takes over manifesting.
11:30	Ray of Jacobs onsite to discuss artesian well capping adjacent to air sparge trailer with CN and CP.
11:45	
12:00	JM and RO onsite to locate Areas 7 and 19 expansion.
12:30	Left voicemail for MD regarding concrete bags beneath muck in Area 22 to remain or be excavated.
12:45	
13:00	RL, WC, EW, AM lunch.
13:30	RL loading trucks at Area 34. WC excavating Area 19 expansion into articulated truck for EW to transport to Area 34.
14:00	
14:30	
14:40	
15:00	CN completes tour. CP and JB staking Area 27. Tailgate not latched on truck allows material to spill; AM hand
15:25	shoveled back into stock pile. WC placing backfill in Area 19 with EW on skid steer spreading backfill.
15:30	RL excavating and stockpiling west end (1-ft) of Area 34. EW tracking excavator from Area 19 to 7. WC continues on
16:00	All offsite. CN escorts CP and JB to Area 22 and 30 outside perimeter fenceline.
16:30	
16:40	
16:45	CN, CP, JB leave site.
17:20	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	9	106
--	Backfill:	0	119
--	Topsoil:	0	39

Temperature Range: 48 -- 64 ^{0} F

Weather Conditions: Sunny/Clear

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	8-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP	X	Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB	X	Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM	X	Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	CN stop for ice.
6:45	CN onsite. WC onsite loading one of two trucks at Area 34. CN manifesting.
6:50	
7:00	
7:10	
7:25	
7:30	RL onsite and takes over loading at Area 34. WC transports articulated truck to Area 7 and begins excavating 1-ft and
7:40	loading into articulated truck.
7:45	CN talks to JM and RO who are onsite for SpaceX power outage; scheduled 5 areas in 39B for Monday and they are
8:15	looking at Areas 30/37 while waiting on SpaceX.
8:00	EW onsite in articulated truck transporting Area 7 to Area 34.
8:30	RL to long stick excavator in Area 22 to remove clean fill bench and excavated contaminated soil beneath.
9:00	
9:15	WC completed Area 7 and beings loading trucks at Area 34. EW staging articulated truck inside perimeter fence at
9:45	Area 22 and transporting excavator from Area 7 to 35. CP and JB onsite.
9:40	
10:05	WC loading T&D truck at Area 35. EW offsite with vac truck to top off fuel and drop vac truck at badging station for
10:15	CAT demobilization.
10:50	
11:00	RL offsite to pick up EW. CP and JB at Area 35 discussing schedule with CN.
11:15	CN, CP, JB meet MD at Area 22; All go to Area 30. Will dig Area 37 to meet up with Area 30; 20 feet wide and 2 feet
11:30	deep.
11:45	JB and CP offsite. RL and EW return. EW transports articulated truck to Area 34 from Area 22.
12:00	EW offsite. Lunch.
12:15	RL loading at Area 34. WC loading at Area 35. MD offsite.
12:45	CN, WC, RL lunch.
13:15	RL to Area 22 to backfill and grade slopes. WC excavating and stockpiling Area 35.
14:00	Call to Soil Tech to update ETA of late trucks. Trucks not coming back only 4 more (2 of 4 will be judgement call).
14:30	WC loading from Area 34.
14:40	
15:00	WC loading from Area 35.
15:25	
15:20	CN offsite to LC39B. Bruce Simmons is not in; CN to Area 22 for pump and hosing.
16:00	All offsite.
16:30	
16:40	
16:45	
17:20	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	13	119
--	Backfill:	0	119
--	Topsoil:	0	39

Temperature Range: 47 -- 61 ^{0} F

Weather Conditions: Partly Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	9-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM	X	Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	CN stop for ice.
6:50	
7:00	CN onsite. WC loading 1 of 4 trucks at Area 35. CN manifesting.
7:05	RL onsite and loading trucks at Area 35 with second excavator.
7:25	
7:30	
7:40	
7:45	
8:15	
8:00	WC excavating and stockpiling Area 35 for next round of trucks. CN, RL, WC decontaminate excavator. EW
8:30	transports to Area 37. CN and RL gather pump and hose with 4x4 and retrieve a silt sock. CN and RL install bolts and
9:00	washers to plug weep holes in bed of articulated truck and set up pump to pump upgradient water downstream of
9:05	swale.
9:15	
9:40	
10:00	WC assisting installation of silt sock in tailgate of articulated truck.
10:15	
10:45	Start pump. WC loading trucks in Area 35. RL on skid steer grading backfill in Area 19. EW on skid grading backfill in
11:00	
11:15	
11:30	
11:45	RL checks on pump. Pump seal failed; pump is out of commission.
12:00	Lunch.
12:30	CN, RL, EW exchanged 3-inch pump for spare and restart pumping.
12:45	CN call to Bruce Simmons (LC39B scheduler); CN to present scope of work at meeting on Monday at 7:45 and crew
12:50	can begin Tuesday.
13:00	RL begins excavating Area 37 from south to north and loading onto articulated truck.
14:00	Too much water in swale and a second pump is needed downstream. WC offsite.
14:30	RL offsite to LC34. EW loading trucks at Area 35. CN manifesting.
15:00	
15:25	
15:20	
16:00	CN and EW offsite. Call to MD to report progress and status. Harbor Freight out of 3-inch pumps but put one on hold
16:30	in Melbourne for Saturday pickup.
16:40	
16:45	
17:30	End of day.
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	10	129
--	Backfill:	0	119
--	Topsoil:	0	39

Temperature Range: 48 -- 60 ^{0} F

Weather Conditions: Partly Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	12-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	CN stop for gas.
6:45	CN stop for ice.
6:55	CN onsite. WC onsite already loading one truck at Area 35. CN manifesting.
7:00	RL and AM onsite. Tailgate meeting.
7:15	WC continues to excavate and stock pile. RL and AM prepare new pump for use.
7:25	
7:30	CN offsite to LC39B for meeting to present scope of work at contractors meeting.
7:40	
7:45	
8:00	CN returns to LC39A.
8:15	
8:30	
8:45	One backfill truck begins delivering backfill to Areas 30/37.
9:05	
9:15	RL resumes excavating Areas 30/37 working south to north. EW in articulated truck transporting to Area 34.
9:40	
10:00	
10:15	
10:30	CN offsite to MD office for 39B manifests for signature.
11:00	CN returns to LC39A.
11:15	
11:30	
11:45	
12:00	Lunch
12:30	All resume
12:45	
12:50	
13:00	WC and CN load 4x4 and skid steer on flat bed trailer for LC39B tomorrow.
14:00	
14:30	Third round of two trucks from Area 35. AM manifesting.
15:00	
15:15	
15:30	RL completes section of Area 37/30 between berms. CN photographs, RL begins spreading backfill along bottom of excavation. Storms moving in.
16:00	All offsite. CN to Home Depot for seed and supplies. Very heavy rains.
16:30	
16:40	
16:45	
17:30	
18:00	End of day. Call from Garrido; backfill pit closed tomorrow due to heavy rains.

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	6	135
--	Backfill:	7	126
--	Topsoil:	0	39

Temperature Range: 63 -- 77 ^{0} F

Weather Conditions: Rain



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	13-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	CN stop for ice.
6:55	CN onsite. WC and AM already onsite.
7:05	One T&D truck onsite. WC loading at Area 35. AM manifesting.
7:15	RL onsite; fueling and starting pumps at Area 30/37.
7:25	
7:30	AM assisting RL move pumps to new locations. CN looking for SpaceX electrician (Angelo Palverento (AP)) to check
7:40	line found that WC must have scraped with excavator yesterday. Call to Jose Espinoza (AP's supervisor) to have AP
7:45	come to location.
8:00	Call to Bobby Lochmueller (Soil Tech) (BL) for estimated time of arrival for second truck. EW onsite and calling CAT
8:15	for estimated time of arrive of third excavator.
8:30	AP and second electrician assist CN and WC looking for source of line (dead). AP assumes it was old and out of
8:45	service and instructed us to bury it.
9:05	
9:15	
9:45	Text from BL; second truck just left landfill. WC loading last of Area 35 material into articulated truck for EW to move
10:00	to Area 34.
10:15	
10:30	WC decontaminates excavator and tracks to Area 34. AM reinstalling silt sock on tailgate of articulated truck.
11:00	RL resumes excavating Area 37/30 working south to north into articulated truck. WC loading T&D truck at Area 34.
11:15	AM manifesting. CN gathering supplies for LC39B. Call to MD to report progress.
11:30	
11:45	
12:00	CN and WC to LC39B. EW loading T&D truck at Area 34.
12:30	
12:45	
12:50	Lunch
13:15	RL and EW continue excavating swale.
13:30	AM stakes silt sock to culvert entrance downstream of swale. Articulated truck full; RL taking load to Area 34.
14:10	AM offsite to deliver blower to CN at LC39B.
14:40	AM back onsite at LC39A.
15:15	One T&D truck arrives. EW begins loading truck.
15:30	RL continues excavating Area 37/30 and loading into articulated truck. RL takes full articulated truck to Area 34.
16:05	EW offsite.
16:15	
16:40	RL takes last load of day from Area 30/37 to Area 34 in articulated truck.
16:50	AM and RL offsite.
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	4	139
--	Backfill:	0	126
--	Topsoil:	0	39

Temperature Range: 60 -- 73 ^{0} F

Weather Conditions: Rain



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	13-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	CN stop for ice.
6:55	CN onsite. WC and AM already onsite.
7:05	One T&D truck onsite. WC loading at Area 35. AM manifesting.
7:15	RL onsite; fueling and starting pumps at Area 30/37.
7:25	
7:30	AM assisting RL move pumps to new locations. CN looking for SpaceX electrician (Angelo Palverento (AP)) to check
7:40	line found that WC must have scraped with excavator yesterday. Call to Jose Espinoza (AP's supervisor) to have AP
7:45	come to location.
8:00	Call to Bobby Lochmueller (Soil Tech) (BL) for estimated time of arrival for second truck. EW onsite and calling CAT
8:15	for estimated time of arrive of third excavator.
8:30	AP and second electrician assist CN and WC looking for source of line (dead). AP assumes it was old and out of
8:45	service and instructed us to bury it.
9:05	
9:15	
9:45	Text from BL; second truck just left landfill. WC loading last of Area 35 material into articulated truck for EW to move
10:00	to Area 34.
10:15	
10:30	WC decontaminates excavator and tracks to Area 34. AM reinstalling silt sock on tailgate of articulated truck.
11:00	RL resumes excavating Area 37/30 working south to north into articulated truck. WC loading T&D truck at Area 34.
11:15	AM manifesting. CN gathering supplies for LC39B. Call to MD to report progress.
11:30	
11:45	
12:00	CN and WC to LC39B. See AM's notes for 39A.
12:30	CN and WC unload skid steer and 4x4. MD onsite.
12:45	
12:50	
13:00	CAT onsite with excavator. MD assisting CN replace stakes at SB1563 knocked out by water line construction.
13:30	WC excavating six inches from SB1310 and loading into dump truck. MD offsite.
14:00	WC tracks excavator to former transformer area (FTA) and beings excavating. CN hand shoveling for utilities and
15:00	edges of excavation areas.
15:15	
15:30	
16:00	
16:15	WC transporting dump truck to SB1514 and CN begins tracking excavator to SB1471.
16:30	WC picks up CN in 4x4 to pickup truck and offsite. Pad closes at 4:30.
16:45	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	0
--	Backfill:	0	0
--	Topsoil:	0	0

Temperature Range: 60 -- 73 ^{0} F

Weather Conditions: Rain



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	14-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN		Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	AM and RL onsite. One T&D truck waiting. RL begins loading truck.
6:56	Another T&D truck arrives onsite.
7:00	First truck offsite. RL begins loading second T&D truck.
7:12	Second T&D truck offsite.
7:25	
7:30	Third T&D truck arrives onsite. RL begins loading truck.
7:40	
7:48	Third T&D truck fully loaded and offsite. Fourth T&D truck arrives onsite.
8:00	EW onsite.
8:13	Fourth T&D truck loaded and offsite. RL and EW resume excavating and transporting soil from 30/37 to 34.
8:30	
8:45	
9:05	
9:15	
9:30	
9:45	
10:00	RL struck utility line in swale. RL call to CN.
10:15	
10:20	
10:30	AM offsite to wait at former observation deck to direct T&D trucks to either LC39A or LC39B as CN instructs him.
10:45	
11:00	
12:00	
12:30	RL loading T&D trucks at Area 34. AM returns to site.
12:45	EW offsite to LC39B to retrieve dump truck.
12:50	Backfill truck arrives; dumping backfill in Area 30/37 swale.
13:00	
13:15	Second backfill truck arrives and dumping in Area 30/37 swale. EW onsite with dump truck.
13:25	
13:50	Third backfill truck arrives and dumping in Area 30/37 swale. AM takes EW offsite to LC39B to retrieve pickup.
14:00	Fourth backfill truck arrives and dumping in Area 30/37 swale. AM returns.
14:22	EW onsite.
14:47	Fifth backfill truck arrives and dumping in Area 30/37 swale.
15:00	All offsite
16:30	
16:45	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	7	146
--	Backfill:	9	135
--	Topsoil:	0	39

Temperature Range: 57 -- 64 ^{0} F

Weather Conditions: Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	14-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	CN picks up WC.
6:45	CN stops for ice.
6:55	CN and WC sign in at LC39B.
7:00	WC resumes tracking excavator to SB1471 and begins excavating six inches. CN texting/calling AM and Bobby
7:15	Lochmueller (Soil Tech) to coordinate T&D from LC39A and LC39B today.
7:25	
7:30	
7:40	
7:45	
8:00	SB1471 excavation complete. WC moves dump truck to SB1563 then tracks excavator to SB1566. Two topsoil trucks onsite. CN escorts them to Former Transformer Area.
8:15	WC excavating six inches from SB1563. CN hand excavating to clear utilities.
8:30	
8:45	
9:05	
9:15	
9:30	CN spots two topsoil trucks; one at SB154; 2/3 at SB1471 and 1/3 at SB1310.
9:45	
10:00	WC snagged a single black wire (1/4-in diameter) at SB1563. RL call that he severed what appears to be a
10:10	communication line at Areas 30/37 at LC39A. Call to RO; he will come out later to look at wire at LC39B, call Tom
10:20	Dessert at SpaceX for LC39A.
10:30	Mark Speranza onsite. AM staged at former observation deck to direct T&D trucks to either LC39A or LC39B as CN instructs him.
10:45	MD onsite.
11:00	WC loading trucks.
12:00	
12:20	Three trucks arrive. CN send two trucks to LC39A.
12:45	
12:50	
13:00	EW onsite to take dump truck offsite.
13:15	Dig police onsite to check communication line. RO called communications to come look but he thinks line is dead.
13:25	MD offsite.
13:30	Communication onsite; confirms that it is a dead line. Communication and RO offsite.
14:00	MS offsite. EW returns, EW back to LC39A. WC on skid steer grading backfill to restore road in SB1563 and placing
14:30	backfill and grading topsoil.
15:00	WC loading two more trucks at SB1514 for a total of 5 trucks.
16:00	WC decontaminates excavator bucket and tracks it to perimeter road and tops off fuel.
16:30	CN and WC offsite.
16:45	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	5	5
--	Backfill:	0	0
--	Topsoil:	6	6

Temperature Range: 57 -- 64 ^{0} F

Weather Conditions: Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	15-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:15	CN stop for gas.
6:30	CN stop for ice.
6:50	CN onsite at LC39A. RL already onsite loading four trucks at Area 34. CN manifesting. WC onsite at LC39B on skid
6:55	steer placing and grading topsoil at SB1514, SB1471, SB1310 and Former Transformer Area.
7:00	
7:15	
7:25	
7:30	
7:40	
7:45	RL prepping to resume Area 30/37 excavation.
8:00	EW onsite. RL resumes excavating Area 30/37 and loading articulated truck for EW to transport to Area 34.
8:15	CN to LC39B.
8:30	CN raking and seeding SB1310.
8:45	
9:05	
9:15	CN and WC attach seeder to 4x4 and CN uses seeder to aerate SB1514 and SB1563. CN applies seed to both areas
9:30	with hand broadcaster and WC tracks seed in with skid steer.
9:45	
10:00	
10:15	CN to LC39A for second round of trucks.
10:20	
10:30	
10:45	
11:00	EW loading trucks at Area 34.
11:15	Replace EW with RL due to all five trucks at one time.
11:45	WC completed seeding SB1471 and Former Transformer Area and leaves LC39B to return to LC39A.
12:15	Lunch
12:45	RL and EW resume. WC on skid steer placing backfill in Area 35. CN offsite to LC39B to take final photographs, sign
13:00	out, and notify pad leader of completion.
13:15	
13:25	
13:30	CN returns to 39A.
14:00	
14:30	
14:45	Third round of trucks arrive. WC loading trucks from Area 34.
16:00	
16:30	All offsite.
16:45	
17:30	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	14	160
--	Backfill:	16	151
--	Topsoil:	0	39

Temperature Range: 53 -- 65 ^{0} F

Weather Conditions: Rain



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	16-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:15	CN stop for ice.
6:45	CN onsite. WC already onsite loading three trucks at Area 34. CN manifesting.
6:50	
7:00	Fourth truck arrives. RL and EW onsite. RL resumes excavating Area 30/37, loading articulated truck for EW to
7:10	transport to Area 34.
7:25	
7:30	Fifth truck arrives onsite.
7:45	
8:00	Two trucks begin delivering backfill to Area 30/37 and Area 35.
8:15	
8:30	
8:45	
9:00	CN and WC gather tools and supplies to install pipe supports across concrete flume for four air sparge wells and begin
9:30	installation.
9:45	
9:40	
10:00	WC prepping to load second round.
10:15	One backfill truck broke down at pit. CN texts Bobby (SoilTech) to cancel third round of trucks (not enough material
10:50	stockpiled).
11:00	Second round of trucks. WC loading. CN manifesting.
11:30	
11:45	
12:00	
12:30	Lunch
12:45	
13:00	RL and EW resume. CN and WC installing steel pipes across concrete flume and welding HDPE pipe.
13:30	
14:00	
14:30	
14:40	
15:00	
15:25	
15:30	
16:00	All offsite.
16:30	
16:40	
16:45	
17:20	
18:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	10	170
--	Backfill:	11	162
--	Topsoil:	0	39

Temperature Range: 49 -- 57 ^{0} F

Weather Conditions: Rain

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	19-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH	X	Mark Mengel	MM	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:15	
6:45	
6:50	
7:00	RL onsite. Fueling and starting pump at Area 30/37.
7:10	
7:25	
7:30	CN stop for ice.
7:45	
8:00	CN onsite.
8:15	AM and EW onsite. EW drives articulated truck between utility racks with CN, AM, RL spotting to make sure it will
8:30	access Area 27. One backfill truck onsite delivering backfill to Area 30/37 and Area 35.
8:45	
9:00	RL on skid steer placing backfill in Area 31 to prepare for air sparge trailer delivery. EW on skid steer placing backfill
9:30	in Area 17. CN and AM repairing one-inch steel pipe at Area 17 broken during backfilling.
9:45	
9:40	
10:00	AM tracking mini excavator from Area 17 to 31. CN delivering 4x4 to Randy Keyser at Area 516.
10:15	
10:45	CH onsite.
11:00	CN returns and restarts pumps.
11:30	
11:45	
12:00	Lunch
12:30	CN and AM move pumps. RL prepares to resume excavating Area 30/37. EW onsite condensing stockpile at Area 34.
12:45	
13:00	RL resumes excavating, EW in articulated truck.
13:15	CH offsite to escort AS trailer delivery.
14:00	CH returns with trailer and escorts delivery driver offsite. AM assisting CH place fittings on trailer and pipe rack.
14:30	
14:40	
15:00	
15:25	
15:30	CN and AM hand digging utilities and spotting for RL.
17:00	AM offsite. Utility struck greater than 3-ft from paint marking. Slow water leak from 3-in cast iron or steel line.
17:30	
18:00	Section with utilities completed. Allowing line to drain overnight and check if still running in the morning. All offiste.
18:15	
18:30	
18:45	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	170
--	Backfill:	6	168
--	Topsoil:	0	39

Temperature Range: 42 -- 66 ^{0} F

Weather Conditions: Rain

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	20-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	X
Project Engineer:	Chris Hook	CH	X	Jeff Rapolti	JR	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	CN stop for ice.
6:15	CN onsite. WC already onsite loading four trucks at Area 34. CN manifesting.
6:45	
6:50	
7:00	RL and AM onsite. AM fuels and restarts pumps at Areas 30/37. RL prepping to resume excavation. Fifth truck
7:10	arrives onsite.
7:25	
7:30	EW onsite.
7:45	RL resumes excavating Areas 30/37. EW on articulated truck transporting to Area 34.
8:00	CH onsite. WC on skid adjusting location of air sparge trailer. Two backfill trucks onsite delivering backfill to Areas
8:15	30/37.
8:30	
8:45	
9:00	Tim Goff of New Energy onsite briefly to discuss power connection to trailer.
9:30	
9:45	
9:40	
10:00	JR and SV onsite. Both at air sparge trailer with CH.
10:15	
10:30	Second round of T&D trucks; CN manifesting and WC loading. AM relocating pump for RL.
11:00	
11:30	
11:45	
12:00	
12:30	Lunch
12:45	
13:00	All resume.
13:15	
14:00	Third round of T&D trucks onsite.
14:30	
14:40	
15:00	
15:25	
15:50	Fourth truck driver tells CN that fifth truck will be here in 10 minutes. CN asks RL and EW to stay late.
16:15	
16:30	RL and EW offsite. AM moving pumps and hoses.
16:45	CN call to SoilTech; Fifth truck is stuck at landfill. CN and WC assisting AM.
17:30	AM and WC offsite. Pad closing for launch tonight. CN installing plywood cover at outfall of culvert outside perimeter
17:45	fence at end of Area 30/37.
16:00	CN offsite.

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	14	184
--	Backfill:	14	182
--	Topsoil:	0	39

Temperature Range: 46 -- 69 ^{0} F

Weather Conditions: Partly Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	21-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	X
Project Engineer:	Chris Hook	CH	X	Jeff Rapolti	JR	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:20	CN stop for ice.
6:40	CN onsite. WC already onsite loading three trucks. CN refueling and starting pump at Area 30. CN on mini
6:45	excavating sump for pump intake.
6:50	
7:00	CN manifesting. EW and RL onsite. Preparing to resume excavation of Area 30/37.
7:15	RL tracked excavator from west side of swale to east side of swale and resumes excavation.
7:25	
7:30	AM and SV onsite. SV begins blocking and leveling air sparge trailer. AM assisting CN.
7:45	JR onsite; begins assisting SV.
8:00	CH and air sparge trailer representative onsite.
8:15	
8:30	CN and AM offsite to set up 2-inch pump outside perimeter fence at end of Area 30/37.
8:45	
9:00	
9:15	CN and AM return. Fifth truck onsite. One backfill truck delivering today only dropped two loads before pit cut him off
9:25	due to broken hydraulic line on pit excavator.
9:30	MD onsite. Tours air sparge trailer with CH. CN provides project status.
10:00	
10:15	
10:30	MD offsite. CN call with JB regarding new data results.
10:40	Second round of T&D trucks begins.
11:30	
11:45	
12:00	Lunch
12:30	All resume. AM hand digging for utilities for RL. CN marking edges of Areas 27 and 1.
12:45	
13:00	
13:30	T&D truck onsite. WC loading and CN manifesting.
14:00	CN check on Areas 30/37 excavation and quantify remaining volume left to remove. Email Cliff Depillo of AWMS to
14:20	only send two trucks for next 2 days; 12 loads remaining.
14:30	Third round of T&D trucks begin.
15:00	
15:25	
16:00	CH, RL, EW, AM offsite.
16:15	
16:30	AM offsite. CN housekeeping and marking Area 8 boundary.
17:00	CN offsite.
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	13	197
--	Backfill:	2	184
--	Topsoil:	0	39

Temperature Range: 51 -- 72 ^{0} F

Weather Conditions: Mostly Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	22-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	X
Project Engineer:	Chris Hook	CH	X	Jeff Rapolti	JR	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM	X	Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	CN stop for ice.
6:45	
6:50	CN onsite. WC already onsite but no trucks.
7:00	Two trucks onsite. WC loading and CN manifesting. AM onsite and fueling and starting pumps.
7:15	
7:30	RL and EW onsite. RL resumes excavating Area 30/37 into articulated truck for EW to transfer to Area 34. Second
7:30	truck decided to dump load back on stockpile due to cracked leaf springs. Call to Bobby at SoilTech to inform him; he'll
7:45	try to replace with another truck.
8:00	CH, SV, JR and Jim Friedling onsite working on air sparge trailer; still no power but maybe today. JM and RO onsite to
8:15	locate utilities for trailer tie downs and Areas 27, 1, 8, and 42. One backfill truck delivering backfill arrives onsite.
8:30	
8:45	
9:00	
9:15	
9:25	
9:30	CAT onsite to demob excavator from LC39B. CN discovered water being pumped from utility vault into ditches leading
10:00	to Area 30/37. CN and AM making calls and speaking with SpaceX personnel to find out who, what, why, and if it can
10:15	be stopped; all believe it is NASA. We will move our pump to keep up with water to keep berms in swale from
10:30	breaching.
11:00	Second backfill truck delivering backfill.
11:30	
11:45	
12:00	Lunch
12:30	All resume. WC on mini excavating Area 27 or on skid steer pushing backfill in Area 35 between T&D truck.
12:45	
13:00	
13:30	
14:00	
14:20	
14:30	Power to air sparge trailer. CH and JR testing startup.
15:00	
15:25	
16:00	
16:15	CN, AM, RL, EW, WC, offsite.
16:30	
17:00	CN at Walmart for supplies.
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	3	200
--	Backfill:	12	196
--	Topsoil:	0	39

Temperature Range: 51 -- 75 ^{0} F

Weather Conditions: Mostly Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	23-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:20	CN stop for ice.
6:30	
6:45	CN onsite. WC already onsite but no trucks.
6:50	
7:00	
7:15	EW, RL, AM onsite. RL on mini excavator. EW positions articulated truck and gets in excavator to complete Area
7:30	30/37 just inside perimeter fence. CN hand excavating right along fence. AM refueling and starting pump to lower
7:30	water level of south end of Area 30/37 for backfill placement.
7:45	
8:00	One T&D truck onsite. WC loading at Area 34 and CN manifesting.. One backfill truck delivering backfill.
8:15	
8:30	
8:45	CN asks security to open Gate 8.
9:00	EW, RL, AM take articulated truck and mini excavator to Area 30/37 outside perimeter fence. WC tracking RL's
9:15	excavator to Area 27 to excavate 6-inches.
9:25	
9:30	
10:00	
10:15	
10:45	One T&D truck. WC loading at Area 34 and CN manifesting.
11:00	
11:30	
11:45	
12:00	Lunch.
12:30	RL on excavator excavating 6-inches from Area 27 and loading articulated truck for EW to transport to Area 34. CN
12:45	painting Area 42.
13:00	
13:30	
14:00	
14:20	
14:30	More T&D trucks. WC loading and CN manifesting. MD onsite. AM and EW offsite to Orlando to pick up Vaccon.
15:00	RL driving articulated truck from Area 27 to Area 34 after he fills it, CN spotting RL to drive between LOX pipes and
15:25	utility rack between manifesting trucks.
16:00	WC, RL offsite. CN and MD discuss sample results and locations in Area 42.
16:15	
16:30	
17:00	MD offsite. CN offsite.
17:30	
17:45	
16:00	EW drops Vaccon at site and departs.

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	8	208
--	Backfill:	8	204
--	Topsoil:	0	39

Temperature Range: 63 -- 76 ^{0} F

Weather Conditions: Partly Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	26-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH	X	Jeff Rapolti	JR	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:40	
6:30	
6:45	
6:50	
7:00	
7:15	
7:30	
7:40	CN stop for ice.
7:45	
8:00	CN, RL, WC, AM, EW onsite. Tailgate meeting.
8:15	Two backfill trucks begin delivering to Area 30/37. RL on excavator, resumes excavating 6-inches from Area 27 and
8:30	loading articulated truck for EW to transport to Area 34. WC on excavator stacking Area 34 soil pile. CN and AM
8:45	removing plywood dam from end of Area 30/37. CH and JR set up summa canisters and monitor air sparge system.
9:00	
9:15	CN and AM walk Area 42 to plan excavation.
9:25	
9:30	
10:00	CN and AM plumbing vaccon to fill water tanks.
10:15	
10:45	
11:00	RL completes Area 27 and tracking excavator to Area 8.
11:30	
11:45	
12:00	Lunch
12:30	RL begins excavating 1-ft from Area 8 and loading articulated truck for EW to transport to Area 34. AM filling water
12:45	truck. WC tracks mini excavator from Area 31 to Area 42, CN and WC erect pallet bridge to track it over concrete
12:55	swale.
13:00	WC on mini excavating 6-inches from north end of Area 42 between concrete swale and utility rack and placing soil
13:30	over utilty rack. AM beings vaccuuming 3- to 4-ft (water table) from Area 42. CH and JR installing pipe clamps on
13:45	steel piping for air sparge wells 86, 87, 92, and 93.
14:00	JR assisting AM. CH offsite to meet with MD. CN hand digging in area 8 to locate utilities.
15:00	AM moves vaccon to Area 8 to pothole utility markings.
15:30	WC offsite with skid steer to assist CS with stuck 4x4 at CCB.
16:00	All offsite.
16:15	
16:30	
17:00	
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	208
--	Backfill:	16	220
--	Topsoil:	0	39

Temperature Range: 50 -- 66 ^{0} F

Weather Conditions: Rain

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	27-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
6:50	
7:00	
7:10	CN stop for ice.
7:30	CN onsite.
7:30	
7:45	RL onsite; greasing excavator at Area 8. WC onsite; on excavator in Area 34 condensing soil pile.
8:00	EW and AM onsite. EW on articulated truck in Area 8. AM sets up summa canister.
8:15	JR onsite. AM and JR resume vacuuming in Area 8. RL resumes excavating Area 8, loading articulated truck and EW
8:30	transports it to Area 34. WC on mini resumes excavating 6-inches from northern end of Area 42. CN hand digging
8:45	edges and around utilities in Area 8. Two backfill trucks delivering backfill to Area 30/37.
9:00	
9:15	
9:25	
9:30	
10:00	
10:15	
10:45	
11:00	
11:30	
11:45	
12:00	Lunch
12:30	All resume.
12:40	JR offsite for appointment.
12:55	
13:00	
13:30	
13:45	
14:00	Area 8 excavation completed. AM transports vaccon to Are 1 to vac 6-inches around obstructions and potholing utility
14:15	markings. RL tracks excavator to Area 5 to place backfill in swale.
15:00	CN walks Area 42 with WC to plan phases of excavation.
16:00	All offsite.
16:15	
16:30	
17:00	
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	208
--	Backfill:	16	236
--	Topsoil:	0	39

Temperature Range: 42 -- 66 ^{0} F

Weather Conditions: Sunny/Clear

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	28-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X		Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP			Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH	X		Jeff Rapolti	JR	X
Project Support:	Jennifer Buel	JB			Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
6:50	
7:00	
7:10	CN stop for ice.
7:30	CN onsite. RL onsite. CN and RL discuss Area 35 backfill and upcoming LC-34 work.
7:30	
7:45	One of two backfill trucks begin delivering backfill. EW onsite leading them to Area 5 (1/2 load) and Area 8 (4.5 loads).
7:50	WC onsite, tracking mini excavator from Area 42 to Area 1 and begins excavating 6-inches from pad curb edge and
7:55	casting to center of area.
8:00	RL on excavator completes grading Area 5 swale and tracks to Area 1. AM onsite, resumes vacuuming Area 1. JR
8:10	onsite, setting out summa canister.
8:15	CN and JR offsite to CCF to retrieve 2-inch PVC piping.
9:00	CN and JR return. JR assisting AM. RL excavating 6-inches from Area 1 and loading articulated truck for EW to
9:25	transport to Area 34.
9:30	
10:00	
10:15	
10:45	
11:00	
11:30	
11:45	
12:00	
12:30	Lunch
12:40	
12:55	
13:00	All resume. CN hand digging edges and clearing utilities for RL.
13:30	
13:45	
14:00	
14:15	
15:00	AM and JR transport vaccon to Area 42 and begin vacuuming 3-feet (to water table) between above ground utilities.
16:00	All offsite. CN to Home Depot and Harbor Freight for supplies.
16:15	
16:30	
17:00	
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	208
--	Backfill:	16	252
--	Topsoil:	0	39

Temperature Range: 44 -- 58 ^{0} F

Weather Conditions: Partly Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	29-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	X
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
6:50	
7:00	
7:10	CN stop for ice.
7:30	CN onsite. RL onsite.
7:30	
7:45	WC, AM and EW onsite. Tailgate meeting.
7:50	
7:55	
8:00	JR onsite. AM and JR resume vacuuming Area 42. RL on excavator resumes excavating 6-inches from Area 1 and
8:10	loading articulated truck for EW to transport to Area 34. WC on mini excavating 3-ft (water table) in northwest corner of
8:15	Area 42 around a 6-inch PVC line and periodically running excavator at Area 34 and keep the stockpile condensed as
9:00	EW or AM dumps. CN assembling 2-inch lay flat hoses.
9:25	
9:30	Call from MD to discuss project status.
10:00	
10:15	
10:45	
11:00	
11:30	CN sent photo of exposed footers to MD and CP and recommends stepping out 6-inches to 1-ft once the bottom of the
11:40	foundation was reached to minimize risk of undermining.
11:45	Call with CH to discuss manpower for LC-34 and LC-39A next week.
12:00	Lunch
12:30	All resume. Clog in vaccon; AM and JR worked on dislodging clog for several hours with assistance later from WC and
12:55	CN.
13:00	Another call with CH; RL and JR will report to LC-34 on Monday.
13:30	Call with CP to discuss foundations and manpower.
13:45	
14:00	
14:30	Clog (chunk of concrete) dislodged from vaccon. AM emptying tank at Area 34.
15:00	
15:30	Call with MD; agrees with stepping out at bottom of foundations.
16:00	All offsite.
16:30	
17:00	
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	208
--	Backfill:	0	252
--	Topsoil:	0	39

Comments:

--

Temperature Range: 45 -- 69 ^{0} F

Weather Conditions: Partly Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	30-Jan
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN		Ronnie Linton	RL	X	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC		
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X	
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV		
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR		
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS		

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	CN, AM and WC off today.
6:30	RL and EW onsite. Both on excavators placing backfill in Area 30/37 and shaping swale.
6:45	
6:50	
7:00	
7:10	
7:30	
7:30	
7:45	
7:50	
7:55	
8:00	
8:10	
8:15	
9:00	
9:25	
9:30	
10:00	
10:15	
10:45	
11:00	
11:30	
11:40	
11:45	
12:00	
12:30	
12:55	
13:00	
13:30	
13:45	
14:00	
14:30	
15:00	
15:30	
16:00	
16:30	
17:00	
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	208
--	Backfill:	0	252
--	Topsoil:	0	39

Temperature Range: 45 -- 70 ^{0} F

Weather Conditions: Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	2-Feb
06925			Year:	2015
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Dan Forester	DF	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
6:50	
7:00	
7:15	CN stop for ice.
7:30	CN stop at LC-34. RL onsite. CN described punchlist items for RL, JR, and DF to work on if SV didn't have tasks.
7:30	WC, EW, AM onsite LC-39A. WC on excavator excavating 3-ft (to water table) in Area 42. EW on excavator grading
7:45	30/37 to flow. AM resumes vacuuming 3-ft (to water table) in Area 42.
7:50	
7:55	
8:00	
8:10	
8:15	CN onsite LC-39A.
8:20	
8:25	
8:30	
9:00	
10:00	EW on mini and CN go outside the Helipad 8 gate to lift the separated RCP section from the end of 30/37 and set aside for later repair.
10:30	EW on skid steer placing b ackfill in Area 2 and then spreading topsoil.
11:00	
11:30	
11:40	
11:45	
12:00	
12:30	Lunch
12:55	
13:00	All resume. CN hand digging to locate utilities for WC.
13:30	
13:45	
14:00	
14:45	
15:00	
15:15	CH sent text to CN asking him to reboot the AS System.
15:30	CN rebooted the AS System.
16:00	All offsite.
17:00	
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	208
--	Backfill:	0	252
--	Topsoil:	0	39

Temperature Range: 45 -- 64 ^{0} F

Weather Conditions: Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	3-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
6:50	
7:00	
7:10	
7:30	CN stop for ice.
7:30	
7:45	
7:50	
7:55	
8:00	CN onsite. WC, EW, AM onsite. Tailgate meeting.
8:10	
8:15	WC on excavator resumes excavating to water table and stockpiling in Area 42. AM resumes vacuuming to water table in vicinity of above ground utilities in Area 42. EW tracking excavator from Area 30/37 to Area 42. RL onsite briefly to drop Fed-Ex deliveries.
8:20	
8:25	
8:30	WC tracking mini from Area 42 to Area 34 to condense vac dumps into stockpile. CN checking thumb drive connection at air sparge trailer. CN discussed artesian well plugging with Ray of Core and shows Dinh, Romeo and Jacobs employees through trailer.
9:00	WL resumes in Area 42. EW casting WC's stockpile closer to south edge of Area 42 with excavator.
10:00	CS onsite to collect dioxin samples outside Area 42 perimeter.
10:45	
11:00	
11:30	
11:40	
11:45	
12:00	Lunch
12:30	All resume. CN watching artesian well plugging; minimal water in area.
12:55	
13:00	
13:30	
13:45	
14:00	
14:45	MD onsite. CN briefs MD on project status and artesian well plugging. CS offsite.
15:00	
15:15	CN gathering silt socks from Area 2 for Area 42 perimeter.
15:45	MD offsite.
16:00	All offsite.
17:00	
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	208
--	Backfill:	0	252
--	Topsoil:	0	39

Temperature Range: 45 -- 64 ^{0} F

Weather Conditions: Partly Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	4-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
6:50	
7:00	
7:10	
7:30	CN stop for ice.
7:30	
7:45	
7:50	
7:55	
8:00	CN, WC, EW, AM onsite. Tailgate meeting.
8:10	
8:15	EW on skid steer placing backfill in Area 8. WC on excavator resumes excavating to water table in Area 42. AM cleaning out vac tank at Area 34 while waiting on CAT mechanic. Two backfill trucks onsite delivering backfill to Area 8, Area 42 for triangle between concrete trench and utility racks, then to north end of Area 30/37 the rest of day.
8:20	
8:25	
8:30	
9:00	CAT mechanic onsite tightening belt and then offsite for diesel exhaust fluid.
9:30	AM assisting EW by hand raking fill around obstacles.
10:45	
11:00	
11:30	AM and CN reestablishing stakes in Area 42.
11:40	
11:45	
12:00	Lunch
12:30	EW calling CAT to take articulated truck off rent. AM decontaminating bed of articulated truck at Area 34.
12:55	
13:00	
13:30	EW on skid steer placing backfill in Area 7A and Area 10. CN and AM vacuuming to water table in Area 42 south of concrete trench and north of above ground piping.
13:45	
14:00	
14:45	
15:00	
15:15	
15:45	
16:00	All offsite. Call to John Zwahl of American Waste Management Services to order T&D trucks for all next week.
17:00	
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	208
--	Backfill:	16	268
--	Topsoil:	0	39

Temperature Range: 53 -- 73 ^{0} F

Weather Conditions: Rain



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	5-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
6:50	
7:00	
7:15	CN stops for ice.
7:30	
7:30	
7:45	CN onsite inspecting site from overnight heavy rains; west edge of swale in Area 39 washed out.
7:50	
7:55	
8:00	EW, WC, AM onsite. Tailgate meeting. Backfill trucks cancelled today.
8:10	
8:15	EW on skid steer placing backfill in Area 10. AM moving vacuum truck to Area 34 to dump. WC on mini to condense
8:20	dumped soils at Area 34.
8:25	
8:30	
9:00	AM resumes vacuuming to water table between concrete swale and cooling tower pad in Area 42. WC on excavator
9:30	resumes excavating to water table in Area 34. CN adjusting manifold zones C and D per email from CH. EW installing
9:45	orange stakes to replace fiberglass poles at air sparge locations in Zone A.
10:00	CN and EW housekeeping.
11:00	EW offsite to Staples in Titusville to have CN notes scanned/pdf'd from 9/24 to 12/31. CN assisting AM.
11:40	
11:45	
12:00	
12:30	AM dumping vac, noticed hydraulic fluid in pit from previous dump; dumped contents and placed call to CAT for
12:55	service. EW returns to site.
13:00	
13:15	Lunch
13:30	CAT mechanic onsite.
13:45	Meet with mechanic; he will need all day tomorrow to evaluate.
14:00	AM cleans off excavator and WC tracks it to Area 34 for T&D scheduled for Monday.
15:00	AM, WC, EW, offsite. CN adjusting zones E and F per CH email; call from CH further adjustments needed at air
15:15	sparge trailer for Zone E.
15:45	
16:00	
17:00	CN offsite.
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	208
--	Backfill:	0	268
--	Topsoil:	0	39

Temperature Range: 54 -- 66 ^{0} F

Weather Conditions: Rain



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	6-Feb
06925			Year:	2015
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN		Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM		Wayne Crisafulli	WC	
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:45	
6:50	
7:00	
7:15	
7:30	
7:30	
7:45	
7:50	
7:55	
8:00	
8:10	
8:15	
8:20	
8:25	
8:30	
9:00	
9:30	
9:45	
10:00	
11:00	
11:40	
11:45	
12:00	
12:30	
12:55	
13:00	
13:15	
13:30	
13:45	
14:00	
15:00	
15:15	
15:45	
16:00	
17:00	
17:30	
17:45	
16:00	

Comments:

-- CN, WC, EW, AM, RL, JR, CS in Orlando for OSHA 8-hr Refresher. Dan Forester (DF) working at LC-34 with SV in morning until SV left for travel home. DF contined to work on punchlist items at LC-34.

Trucking Totals:	Today	Cumulative
Disposal:	0	208
Backfill:	0	268
Topsoil:	0	39

--

Temperature Range: 49 -- 65 ^{0} F

Weather Conditions: Sunny/Clear

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	9-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:30	
6:40	CN stops for ice.
6:50	CN onsite, EW and WC already onsite. EW on excavator loading T&D truck from Area 34 stockpile.
7:00	Two additional T&D trucks onsite. EW loading one, WC on excavator loading the other from Area 42 stockpile. CN
7:15	manifesting.
7:30	
7:30	
7:45	
7:50	
7:55	
8:00	AM onsite and preparing to resume vacuuming to water table in Area 42.
8:10	
8:15	
8:20	
8:25	
8:30	AM resumes vacuuming.
9:00	Two backfill trucks begin delivering backfill to Area 30/37. CN and WC walk north side of Area 42 to determine
9:30	equipment selection and access to area.
9:45	
10:00	
10:30	Second round of trucks arrive; only three trucks today.
11:40	
11:45	
12:00	Lunch
12:30	EW offsite to Titusville to pick up scan of CN notes.
12:55	
13:00	
13:15	
13:30	
13:45	
14:00	
14:30	Third round of trucks arrive. WC loading from Area 42. CN manifesting. CN call with JB regarding clarification of Area
15:15	42 excavation depths. EW returns to site.
15:45	
16:00	All offsite.
17:00	
17:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	8	216
--	Backfill:	13	281
--	Topsoil:	0	39

Temperature Range: 52 -- 70 ^{0} F

Weather Conditions: Rain



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:	Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Date:	10-Feb
06925			Year:	2015
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	CN stop for ice.
6:25	CN onsite. One truck waiting.
6:30	WC and EW onsite. WC in excavator loading truck from Area 42 stockpile.
6:50	
7:00	
7:15	Second truck onsite; WC loading. Emailed American Waste regarding lack of trucks.
7:30	
7:30	
7:45	
7:50	
7:55	
8:00	AM onsite. AM resumes vacuuming to water table in crowded utility area of Area 42. CN, EW, WC repairing seed
8:10	tiller trailer and erecting a drag with a pallet; pallet not heavy enough.
8:15	
8:20	
8:25	
8:30	
8:45	Third truck onsite; WC loading.
9:00	EW offsite to retrieve signed manifests from MD and drop off more for signature. CS onsite to collect soil samples at
9:45	locations 902 and 903. CN assists CS with location and triangulation and emails sketch to Mark Jonnet (MJ) and JB.
10:00	EW returns.
10:30	Second round of trucks onsite.
11:15	EW offsite to WC's place for piece of chain link to create drag for seeding. CS offsite.
11:45	
12:00	
12:15	EW returns to site. Lunch
12:45	CN, EW, WC resume erecting drag. AM resumes vacuuming. WC returns to loading trucks with CN manifesting while
13:00	EW tests drag.
13:15	
13:30	
13:45	
14:00	
14:30	CN dragging Area 36.
15:00	EW dragging Area 36 as CN rakes areas drag cannot get to.
15:45	
16:00	
16:15	AM offsite. Last truck arrives; WC loading. CAT onsite to demobilize articulated truck; EW assisting.
16:30	All offsite.
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	11	227
--	Backfill:	0	281
--	Topsoil:	0	39

Temperature Range: 54 -- 63 ^{0} F

Weather Conditions: Cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	11-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	X

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:25	
6:30	
6:50	CN onsite. WC and EW already onsite each loading a truck. WC on excavator at Area 42 and EW on excavator at
6:55	Area 34. CN manifesting.
7:00	Third truck arrives; EW loading.
7:15	AM onsite.
7:30	CN helping AM position vac truck.
7:45	
7:50	
7:55	
8:00	AM resumes vacuuming to water table in Area 42.
8:10	
8:15	Two backfill trucks begin delivering backfill to Area 42 for WC to place in vacuumed area.
8:20	
8:25	
8:30	
8:45	CAT onsite to demobilize skid steer.
9:00	
9:45	MD onsite. CN and MD walk Area 42.
10:00	
10:50	MD offsite.
11:15	
11:45	
12:00	Lunch
12:30	AM resumes, WC excavating to water table and stockpiling soils, EW running 4x4 with aerator in Area 36.
12:45	
13:00	
13:15	
13:30	
13:45	
14:00	
14:30	Last round of trucks. WC loading and CN manifesting.
15:00	
15:45	
16:00	All offsite. CN to MD's office to pick up signed manifests, discussed project status and Area 42 excavation strategy,
16:15	
16:30	
17:00	End of day.
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	11	238
--	Backfill:	16	297
--	Topsoil:	0	39

Temperature Range: 44 -- 62 ^{0} F

Weather Conditions: Partly Cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	12-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X		Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP			Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH			Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB			Chuck Sorden	CS	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:25	
6:30	CN stop for ice.
6:50	CN onsite. EW and WC already onsite, WC on excavator loading three trucks. CN manifesting.
6:55	
7:00	
7:15	
7:30	EW on skid steer preparing to place backfill in Area 34.
7:45	
7:50	
7:55	
8:00	AM onsite, resumes vacuuming Area 42.
8:10	
8:15	Two backfill trucks begin delivering backfill to Area 34; EW placing with skid steer.
8:20	
8:25	
8:30	
8:45	
9:00	
9:45	
10:00	Second round trucks.
10:45	Freese Inc roll off truck onsite to transport 1 of 4 roll-off boxes to JED (driver just completed emptying a debris roll-off
11:15	box from Area 34 at Schwartz and returning the empty).
11:30	CN meets with Jose Espinoza of SpaceX to discuss removing aerial ground wire over utility rack between cooling tower
11:45	and LOX for loading articulated truck over the rack. Jose approved as long as we rehang if there is potential for
12:00	lightening.
12:15	Lunch. CAT onsite for vac truck.
12:45	All resume except vac.
13:00	CN noticed HVAC tanks were overflowing and contacted Chris Angel of SpaceX.
13:30	
13:45	Todd Ziegler and Chris Angel onsite for HVAC, CN identified pipe with running water that has not been noticed before.
13:50	CAT offsite.
14:00	SpaceX's HVAC sub onsite; CN identified pipe; pipe provides makeup water but other end (manual feed) was left open;
14:15	both now closed.
14:30	CN calls to security, MD, JB and SoilTech; Badges can be extended by finger printing; CN sent follow up email to
15:30	resume trucking 2/17 to 2/27. WC excavating and stockpiling 1-ft in Area 42. AM vacuuming around utilities.
16:00	All offsite.
16:30	
17:45	
16:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	11	249
--	Backfill:	15	312
--	Topsoil:	0	39

Temperature Range: 43 -- 73 ^{0} F

Weather Conditions: Mostly cloudy

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	13-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Friday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ronnie Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Chuck Sorden	CS	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD	X	Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:25	
6:30	CN stop for ice.
6:50	CN onsite. WC and EW already onsite loading 3 T&D trucks. WC at Area 42; EW at Area 34. CN manifesting.
6:55	
7:00	
7:15	
7:30	
7:45	
7:50	
7:55	
8:00	AM onsite setting up to resume vacuuming around utilities to water table in Area 42.
8:10	
8:15	One truck begins delivering backfill to Area 34; AM operating vac truck.
8:20	
8:25	
8:30	
8:45	
9:00	
9:45	
10:00	
10:30	Second round of trucks; WC loading and CN manifesting. Discussions with truckers regarding stopping to get
11:00	fingerprinted at badging.
11:15	Call from MD.
11:45	
12:00	
12:15	Lunch
12:45	WC and AM resume.
13:00	EW resumes. Calls to security regarding fingerprinting.
13:30	CN assisting AM
13:45	MD onsite. CN receives voicemail from trucker that left without his manifest. CN emails photo of manifest to the
13:50	landfill.
14:00	MD offsite. CN resumes vacuuming.
14:15	
14:30	
15:30	
15:45	Call from MD; needs IDMax information. CN calls truckers for information and emails it to MD.
16:00	AM, EW, WC offsite.
16:30	CN painting excavation boundaries for dig police Monday morning.
17:00	CN offsite. Call to Garrido to confirm 4 backfill trucks on Monday.

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	9	258
--	Backfill:	8	320
--	Topsoil:	0	39

Temperature Range: 47 -- 59 ^{0} F

Weather Conditions: Sunny/Clear



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	16-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Monday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X		Ron Linton	RL	X
Field Operations Coordinator:	Alex Murphy	AM	X		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP			Skip Vaillancourt	SV	X
Project Engineer:	Chris Hook	CH			Jeff Rapolti	JR	X
Project Support:	Jennifer Buel	JB			Dan Forester	DF	X

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO	X	Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:25	
6:30	
6:50	
6:55	
7:00	
7:20	CN stop for ice.
7:30	CN stop at LC-34. WC onsite at 39A, on skid steer prepping Area 42 for backfill placement.
7:45	RL and JR onsite at LC-34.
7:50	
7:55	
8:00	EW and AM onsite at LC39A. AM resumes vacuuming to water table around utilities at Area 42. EW spotting backfill
8:10	trucks. Four backfill trucks begin delivering backfill to Area 42. RO onsite at 39A marking utilities north of concrete
8:15	swale. DF onsite at LC-34. CN to 39A.
8:20	
8:25	
8:30	CN onsite at 39A. Discuss utility markings with RO.
8:45	
9:00	
9:30	CAT onsite mobilizing wheel loader.
10:00	EW on excavator condensing material dumped from vac in Area 34.
10:15	RO offsite.
10:30	EW placing backfill in Area 42.
11:15	
11:45	
12:00	
12:15	Lunch
12:45	CN received call from RL that LC-34 crew was on way to 39A.
13:00	SV, RL, JR, DF onsite. CN discussed emergency notification procedures and conducted general Q&A regarding
13:15	notifications.
13:30	SV, RL, JR, DF offsite. WC on mini excavator cutting a pathway into the side of the berm north of the Area 39 swale for
13:50	a truck to access north side of Area 42.
14:00	
14:15	
14:30	WC on skid steer finish grading pathway.
15:00	CN and WC transport mini excavator across concrete swale and lower aerial ground above utility rack to prep for
15:20	excavation of Area 42 north.
15:30	WC on skid placing a load of backfill for pathway to bridge soft material.
16:00	All offsite.
17:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	0	258
--	Backfill:	30	350
--	Topsoil:	0	39

Temperature Range: 45 -- 71 ^{0} F

Weather Conditions: Partly cloudy



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	17-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Tuesday

Personnel Summary

Tetra Tech, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X	Ron Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X	Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS		Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP		Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH		Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB		Dan Forester	DF	

Subcontractor:			Onsite			Onsite

Visitors:			Onsite			Onsite	
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	X
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:25	CN stop for ice.
6:30	
6:45	CN onsite at 39A. WC already onsite loading 3 trucks at Area 42. CN manifesting.
6:55	
7:00	
7:20	
7:30	
7:45	AM onsite and dumping vac in Area 34 and filling water tanks.
7:50	
7:55	
8:00	
8:10	
8:15	Two backfill trucks begin delivering backfill to Area 42. EW onsite at LC-34 to drive boom truck to sunshine welding to
8:20	drop steel frame and then return boom truck to NEFF. NASA Safety onsite at 34.
8:25	
8:30	
8:45	NASA Safety, EW and RL offsite at LC-34. AM resumes vacuuming to water table within utility area of Area 42. WC
9:00	excavating to water table in Area 42 and loading into bucket for transfer onto Area 42 stockpile.
9:30	
10:00	Second round of trucks onsite at 39A. WC loading from Area 34 and CN manifesting.
10:15	
10:30	
11:15	
11:45	
12:00	EW returning to 39A. Lunch
12:15	
12:30	EW now on excavator. All resume.
13:00	
13:15	
13:30	Ed Brown of Freese Inc onsite to transport two of four roll off boxes to Omni Landfill.
13:50	
14:00	
14:15	
14:30	
15:00	NEFF onsite mobilizing mini.
15:20	
16:00	AM, WC, EW offsite. CN setting up safety cone barricade at Area 42 and taking photos of progress.
16:30	CN offsite to MD's office to turn in traffic citation received by one of the truckers for speeding outside KSC gates along
17:00	405.

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	14	272
--	Backfill:	7	357
--	Topsoil:	0	39

Temperature Range: 55 -- 79 ^{0} F

Weather Conditions: Rain

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	18-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Wednesday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X		Ron Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP			Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH			Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB			Dan Forester	DF	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:25	CN stop for ice.
6:30	
6:45	CN onsite. EW and WC already onsite; WC on excavator loading one truck from Area 42. CN manifesting.
6:55	
7:00	CN gathering pump and hosing to dewater Area 42 due to overnight rains and partial collapse of the concrete bag
7:05	trench allowing runoff into the excavation.
7:10	Second truck onsite. EW on excavator loading from Area 34. CN manifesting.
7:15	CN and WC setting up pump.
7:50	
7:55	
8:00	Third and fourth trucks onsite. EW loading one and WC the other. CN manifesting.
8:10	
8:15	AM onsite. AM trying to remove apparent clog in vac. CAT mechanic on way to site. WC on mini excavating to water
8:20	table near above ground utilities and loading into excavator bucket for EW to transfer into stockpile.
8:25	
8:30	Rick Cofer of W&J onsite; planning to work on water line today since parts arrived. Rick is having a 4-inch pump
8:45	brought over to dewater quicker for his work. AM assisting WC and EW.
9:00	
9:30	CAT mechanic onsite.
10:00	
10:15	
10:30	Second round of trucks. Brad (mechanic) informs CN that flex hose has eroded to point that it won't maintain suction.
11:15	He will return tomorrow at 7AM with new flex hose to install.
11:45	
12:00	
12:15	
12:30	Lunch
13:00	AM offsite for supplies. WC and EW resume.
13:15	
13:30	
13:50	
14:00	AM returns. CN and AM call JB regarding sampling locations.
14:15	
14:30	Third round of trucks. CN and AM stake sample locations and send photo to JB.
15:00	
15:20	
16:00	
16:30	EW and WC offsite. CN and AM call with CP and JB regarding sample locations.
17:00	CN and AM offsite.

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	12	284
--	Backfill:	8	365
--	Topsoil:	0	39

Temperature Range: 46 -- 60 ^{0} F

Weather Conditions: Rain



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	19-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X		Ron Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP			Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH			Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB			Dan Forester	DF	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:25	Don't need ice today. It's 37 degrees F and dropping.
6:30	
6:45	
6:50	CN onsite. EW and WC already onsite. No trucks.
7:00	
7:05	
7:10	One truck. The second truck is broken down. WC on excavator loading from Area 42. CN manifesting.
7:15	
7:30	WC excavating to 1-ft around stockpile. EW on wheel loader (324) grading backfill in Area 42. CN on mini beginning
7:55	excavation to water table between concrete swale and utility rack in Area 42.
8:00	WC now on mini. CN spotting and hand shoveling. WC placing material in 324 bucket for EW to transfer to stockpile.
8:10	Two backfill trucks begin delivering backfill to Area 42.
8:15	
8:20	
8:25	
8:30	AM onsite. AM prepping to collect soil samples.
8:45	
9:00	AM collecting samples.
9:50	AM completed sampling.
10:00	CAT mechanic onsite to replace flex hoses on vac.
10:15	
10:30	
11:15	
11:30	Second round of truck (only 1 truck today).
12:00	Lunch
12:15	
12:30	All resume.
13:00	AM offsite to meet courier.
13:15	
13:30	
13:50	
14:00	CAT mechanic completes repair of vac and recommends water flush. AM returns to site and proceeds to flush vac with
14:15	water. CN walks LOX area to investigate options for future expansion of 2 header lines for air sparge system outside
14:30	perimeter fence.
15:00	
15:30	Last truck arrives.
16:00	AM, WC, EW offsite. CN adjusts zones E/F per email from CH.
16:30	CN offsite to drop blank manifests at MD's office.
17:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	3	287
--	Backfill:	15	380
--	Topsoil:	0	39

Temperature Range: 37 -- 51 ^{0} F

Weather Conditions: Sunny/Clear



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT

Project No.:	Project Title:		Date:	19-Feb
06925		Launch Complex 39A, SWMU 008 Groundwater and Soil Interim Measures	Year:	2015
			Day:	Thursday

Personnel Summary

Tetra Tech, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Supervisor:	Christopher Neumann	CN	X		Ron Linton	RL	
Field Operations Coordinator:	Alex Murphy	AM	X		Wayne Crisafulli	WC	X
Site Safety & Health Officer:	Matt Shelton	MS			Earl Whitcomb	EW	X
Project Manager:	Chris Pike	CP			Skip Vaillancourt	SV	
Project Engineer:	Chris Hook	CH			Jeff Rapolti	JR	
Project Support:	Jennifer Buel	JB			Dan Forester	DF	

Subcontractor:			Onsite				Onsite

Visitors:			Onsite				Onsite
Mike Deliz	NASA RPM	MD		Romeo Enriquez	NASA Safety	RE	
Jeff McDowell	KSC Dig Police	JM		Philip Falk	NASA Safety	PF	
Ryan Ostarly	KSC Dig Police	RO		Sean O'Brien	CCAFS Dig Police	SO	

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:00	
6:25	Don't need ice today. It's 37 degrees F and dropping.
6:30	
6:45	
6:50	CN onsite. EW and WC already onsite. No trucks.
7:00	
7:05	
7:10	One truck. The second truck is broken down. WC on excavator loading from Area 42. CN manifesting.
7:15	
7:30	WC excavating to 1-ft around stockpile. EW on wheel loader (324) grading backfill in Area 42. CN on mini beginning
7:55	excavation to water table between concrete swale and utility rack in Area 42.
8:00	WC now on mini. CN spotting and hand shoveling. WC placing material in 324 bucket for EW to transfer to stockpile.
8:10	Two backfill trucks begin delivering backfill to Area 42.
8:15	
8:20	
8:25	
8:30	AM onsite. AM prepping to collect soil samples.
8:45	
9:00	AM collecting samples.
9:50	AM completed sampling.
10:00	CAT mechanic onsite to replace flex hoses on vac.
10:15	
10:30	
11:15	
11:30	Second round of truck (only 1 truck today).
12:00	Lunch
12:15	
12:30	All resume.
13:00	AM offsite to meet courier.
13:15	
13:30	
13:50	
14:00	CAT mechanic completes repair of vac and recommends water flush. AM returns to site and proceeds to flush vac with
14:15	water. CN walks LOX area to investigate options for future expansion of 2 header lines for air sparge system outside
14:30	perimeter fence.
15:00	
15:30	Last truck arrives.
16:00	AM, WC, EW offsite. CN adjusts zones E/F per email from CH.
16:30	CN offsite to drop blank manifests at MD's office.
17:00	

Comments:	Trucking Totals:	Today	Cumulative
--	Disposal:	3	287
--	Backfill:	15	380
--	Topsoil:	0	39

Temperature Range: 37 -- 51 ^{0} F

Weather Conditions: Sunny/Clear



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT (SYSTEM STARTUP)

Project No.:	Project Title: Groundwater Interim Measure at Launch Complex 39A	Date:	19-Jan
06925		Year:	2015
		Day:	Monday

Personnel Summary

Tetra Tech NUS, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Support:	Chris Neumann	CN	X		Wayne Crisafulli	WC	
Project Engineer:	Chris Hook	CH	X		Earl Whitcomb	EW	X
System Operator:	Skip Vaillancourt	SV			Matt Shelton	MS	
Field Technician:	Ronnie Linton	RL	X		Chuck Sorden	CS	
Engineering Support:	Jeff Rapolti	JR			Alex Murphy	AM	X
Project Manager:	Chris Pike	MJ					

Subcontractor:			Onsite				Onsite
Tim Goff	New Energy	TG					
Bob Olsen	New Energy	BS					
Jim Frydl	MAE2	JF					

Visitors:			Onsite				Onsite
Mike Deliz	NASA, TA-A4B	MD					
Jose Espinoza	SpaceX, Electric	JE					

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	
8:00	CH onsite (CN, RL, EW, AM previously onsite)
8:30	
9:00	
9:30	
10:00	Installing drain lines on manifold zones for manual purging
10:30	
11:00	
11:30	
12:00	
12:30	
13:00	
13:30	CH leaves site to escort trucking company with AS system delivery to site
14:00	AS system delivered and placed
14:30	CH escorting trucking company back to western security gate
15:00	CH installing cam-lock fittings on header lines and system
15:30	
16:00	
16:30	
17:00	
17:30	AM offset
18:00	CH/EW offsite; CN/RL continue excavation in swale area.

Comments:

Temperature Range: 42 -- 66 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT (SYSTEM STARTUP)

Project No.:	Project Title: Groundwater Interim Measure at Launch Complex 39A	Date:	20-Jan
06925		Year:	2015
		Day:	Wednesday

Personnel Summary

Tetra Tech NUS, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Support:	Chris Neumann	CN	X	Wayne Crisafulli	WC	X
Project Engineer:	Chris Hook	CH	X	Earl Whitcomb	EW	X
System Operator:	Skip Vaillancourt	SV		Matt Shelton	MS	
Field Technician:	Ronnie Linton	RL	X	Chuck Sorden	CS	
Engineering Support:	Jeff Rapolti	JR		Alex Murphy	AM	X
Project Manager:	Chris Pike	MJ				

Subcontractor:			Onsite			Onsite
Tim Goff	New Energy	TG	x			
Jim Frydl	MAE2	JF	x			

Visitors:			Onsite			Onsite
Mike Deliz	NASA, TA-A4B	MD	X			
Jose Espinoza	SpaceX, Electric	JE				

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	
8:00	SV/JR onsite (CN, RL, WC, EW previously onsite)
8:30	CH and JF onsite from badging station. JR/SV leveling trailer and post-hole digging for helical anchors.
9:00	CH/JF performing precommisioning activities and installing louver hoods on doors and intakes.
9:30	MD onsite. Discuss system. TG onsite to discuss electrical. After talking through, TG leaves site.
10:00	
10:30	
11:00	
11:30	
12:00	
12:30	New Energy returns onsite to install electrical disconnect and complete connection to trailer panel.
13:00	SV/JR installing indoor/outdoor carpet below trailer as a dust control measure for the compressor intake.
13:30	SV/JR offsite.
14:00	New Energy offsite.
14:30	
15:00	
15:30	
16:00	
16:30	CH/JF offsite.
17:00	
17:30	
18:00	

Comments:

Temperature Range: 60 -- 70 ^{0} F

Weather Conditions: Sunny.

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT (SYSTEM STARTUP)

Project No.:	Project Title: Groundwater Interim Measure at Launch Complex 39A	Date:	22-Jan
06925		Year:	2015
		Day:	Thursday

Personnel Summary

Tetra Tech NUS, Inc.				Onsite Support Personnel:		Onsite
Field Operations Support:	Chris Neumann	CN	X	Wayne Crisafulli	WC	X
Project Engineer:	Chris Hook	CH	X	Earl Whitcomb	EW	X
System Operator:	Skip Vaillancourt	SV		Matt Shelton	MS	
Field Technician:	Ronnie Linton	RL	X	Chuck Sorden	CS	
Engineering Support:	Jeff Rapolti	JR		Alex Murphy	AM	X
Project Manager:	Chris Pike	MJ				

Subcontractor:			Onsite				Onsite
Tim Goff	New Energy	TG	x				
Jim Frydl	MAE2	JF	x				

Visitors:			Onsite				Onsite
Mike Deliz	NASA, TA-A4B	MD			Jacobs/Core		X
Jose Espinoza	SpaceX, Electric	JE					

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	
8:00	CH/JF/SV/JR onsite (CN, RL, WC, EW previously onsite). KSC dig police cleared anchor and ground rod locations).
8:30	SV/JR installing helical anchors and ground rod. Waiting on SpaceX/KSC ISC to terminate outage in order intiate comissioning and startup of AS system. Completion timeframe unknown.
9:00	TG onsite to discuss remaining electrical tasks (power meter and grounding).
9:30	
10:00	
10:30	New Energy back onsite to install power meter.
11:00	
11:30	New Energy offsite. JF offsite to pickup filter material to use until spec'd intake filters are delivered.
12:00	Jacobs/Core onsite to discuss artesian well abandonment.
12:30	Jacobs/Core offsite
13:00	
13:30	
14:00	Power outage terminated. SpaceX removing LOTO on breaker. Feeder breaker is numbered 64.
14:30	New Energy onsite (1400 to 1430) to test feed at feeder disconnect and then at trailer disconnect. All voltage and ground testing passed. Voltage at 480V.
15:00	JF onsite. Installing inlet filters.
15:30	SV onsite. Start comissioning of system and testing system controls and alarms
16:00	
16:30	
17:00	System deactivated for further testing on 1/23/15. CH/JF/SV offsite.
17:30	
18:00	

Comments:

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Temperature Range: 60 -- 70 ^{0} F

Weather Conditions: Sunny, light breeze.

Field Operations Supervisor Signature

DAILY ACTIVITY REPORT (SYSTEM STARTUP)

Project No.:	Project Title: Groundwater Interim Measure at Launch Complex 39A	Date:	23-Jan
06925		Year:	2015
		Day:	Friday

Personnel Summary

Tetra Tech NUS, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Support:	Chris Neumann	CN	X	Wayne Crisafulli	WC	X
Project Engineer:	Chris Hook	CH	X	Earl Whitcomb	EW	X
System Operator:	Skip Vaillancourt	SV		Matt Shelton	MS	
Field Technician:	Ronnie Linton	RL	X	Chuck Sorden	CS	
Engineering Support:	Jeff Rapolti	JR		Alex Murphy	AM	X
Project Manager:	Chris Pike	MJ				

Subcontractor:			Onsite			Onsite
Tim Goff	New Energy	TG				
Jim Frydl	MAE2	JF	x			

Visitors:			Onsite			Onsite
Mike Deliz	NASA, TA-A4B	MD				
Jose Espinoza	SpaceX, Electric	JE				

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	
8:00	CH/JF/SV/JR onsite (CN, RL, WC, EW previously onsite). KSC dig police cleared anchor and ground rod locations).
8:30	
9:00	Purging header lines for Manifolds A through F.
9:30	
10:00	All header lines purged. Setting up to operate Manifolds E and F. Start applying compressed air to wells at Zones E and F. Initial setting of 30 psig at system manifold and running laterals to wells at 3 scfm (rotameter reading). Corrected flow is 5 scfm @ 25 psig (lateral). Zone E running at 126 scfm at 35.6 psig (at system). Zone F running at 110 scfm at 30.7 at system. Possible restriction in Zone E header.
10:30	Continue flow balancing E/F throughout the day.
11:00	SV offsite.
11:30	
12:00	
12:30	
13:00	
13:30	
14:00	
14:30	
15:00	MD onsite. Walkthrough tour of the system conducted.
15:30	
16:00	
16:30	CH/JR/JF offsite.
17:00	
17:30	
18:00	

Comments:

Temperature Range: 58 -- 70 ^{0} F

Weather Conditions: Sunny, light breeze

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Field Operations Supervisor Signature

DAILY ACTIVITY REPORT (SYSTEM STARTUP)

Project No.:	Project Title: Groundwater Interim Measure at Launch Complex 39A	Date:	24-Jan
06925		Year:	2015
		Day:	Saturday

Personnel Summary

Tetra Tech NUS, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Support:	Chris Neumann	CN		Wayne Crisafulli	WC	
Project Engineer:	Chris Hook	CH		Earl Whitcomb	EW	
System Operator:	Skip Vaillancourt	SV		Matt Shelton	MS	
Field Technician:	Ronnie Linton	RL		Chuck Sorden	CS	
Engineering Support:	Jeff Rapolti	JR		Alex Murphy	AM	
Project Manager:	Chris Pike	MJ				

Subcontractor:			Onsite			Onsite
Tim Goff	New Energy	TG				
Jim Frydl	MAE2	JF				

Visitors:			Onsite			Onsite
Mike Deliz	NASA, TA-A4B	MD				
Jose Espinoza	SpaceX, Electric	JE				

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	
8:00	
8:30	CH onsite. System operational upon arrival. Deploy baseline VC HS area summa canister for TO15 analysis.
9:00	Zones E/F running since previous day. Observe and adjust zone operation.
9:30	
10:00	
10:30	
11:00	Discussing programming with MAE2. Working on modifications to PLC/HMI programming throughout day.
11:30	
12:00	
12:30	
13:00	
13:30	
14:00	
14:30	
15:00	
15:30	
16:00	
16:30	
17:00	CH offsite.
17:30	
18:00	

Comments:

Temperature Range:	52 -- 65 ^{0} F	--
Weather Conditions:	Rainy/overcast in AM to sunny from noon to evening. Very windy (to west).	Field Operations Supervisor Signature

DAILY ACTIVITY REPORT (SYSTEM STARTUP)

Project No.:	Project Title: Groundwater Interim Measure at Launch Complex 39A	Date:	25-Jan
06925		Year:	2015
		Day:	Sunday

Personnel Summary

Tetra Tech NUS, Inc.				Onsite	Support Personnel:		Onsite
Field Operations Support:	Chris Neumann	CN			Wayne Crisafulli	WC	
Project Engineer:	Chris Hook	CH		X	Earl Whitcomb	EW	
System Operator:	Skip Vaillancourt	SV		X	Matt Shelton	MS	
Field Technician:	Ronnie Linton	RL			Chuck Sorden	CS	
Engineering Support:	Jeff Rapolti	JR		X	Alex Murphy	AM	
Project Manager:	Chris Pike	MJ					

Subcontractor:			Onsite				Onsite
Tim Goff	New Energy	TG					
Jim Frydl	MAE2	JF					

Visitors:			Onsite				Onsite
Mike Deliz	NASA, TA-A4B	MD					
Jose Espinoza	SpaceX, Electric	JE					

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	CH onsite. System operational upon arrival. Deploy Day 1 VC HS area summa canister for TO15 analysis.
8:00	JR onsite. Switching operation from manifolds E/F to A/B. A/B operating. Initial rotameter flow setting at 2 scfm/well.
8:30	
9:00	
9:30	SV onsite. Increasing rotameter flow setting to 3 scfm/well.
10:00	
10:30	
11:00	Significant shortcircuiting of air and water observed at approximately 6 locations between manifolds A and C.
11:30	
12:00	Switching operation from manifolds from A/B to C/D. Initial rotameter flow setting at 2 scfm/well.
12:30	
13:00	
13:30	Increasing rotameter flow setting to 3 scfm/well. 1445, summa canister sampling completed. Terminated early due to low vacuum in canister (-3 in. hg)
14:00	
14:30	Installing cellular antenna to outside roof of AS trailer to increase signal strength.
15:00	SV/JR addressing two minor leaks observed at Manifold A and C.
15:30	
16:00	
16:30	CH/JR/SV offsite.
17:00	
17:30	
18:00	

Comments:

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Temperature Range: 48 -- 62 ^{0} F

Weather Conditions: Sunny, western wind



Field Operations Supervisor Signature

DAILY ACTIVITY REPORT (SYSTEM STARTUP)

Project No.:	Project Title: Groundwater Interim Measure at Launch Complex 39A	Date:	25-Jan
06925		Year:	2015
		Day:	Sunday

Personnel Summary

Tetra Tech NUS, Inc.			Onsite	Support Personnel:		Onsite
Field Operations Support:	Chris Neumann	CN		Wayne Crisafulli	WC	
Project Engineer:	Chris Hook	CH	X	Earl Whitcomb	EW	
System Operator:	Skip Vaillancourt	SV	X	Matt Shelton	MS	
Field Technician:	Ronnie Linton	RL		Chuck Sorden	CS	
Engineering Support:	Jeff Rapolti	JR	X	Alex Murphy	AM	
Project Manager:	Chris Pike	MJ				

Subcontractor:			Onsite			Onsite
Tim Goff	New Energy	TG				
Jim Frydl	MAE2	JF				

Visitors:			Onsite			Onsite
Mike Deliz	NASA, TA-A4B	MD				
Jose Espinoza	SpaceX, Electric	JE				

Description of Work Performed, Problems Encountered and Resolutions:

Time	
6:30	
7:00	
7:30	
8:00	CH/JR onsite. System operational upon arrival. Pulse cyclying currently set to run at Manifolds C and D. Deploying summa canister in VC HS area (same sampling location as D1 and baseline).
8:30	Flows checked in manifolds C and D enclosures. Balanced to 3 scfm on rotameter (approximately 5 scfm).
9:00	
9:30	
10:00	Pulse zones automatically switched to zones E/F. Pulse cycling between zones working properly.
10:30	Balancing flows at E/F to 3 scfm on rotameter. AS090 and AS115 not showing back pressure. Suspected line/well
11:00	
11:30	
12:00	
12:30	
13:00	SV onsite. Discuss future operations for IM.
13:30	CH offsite to meet with Mike Deliz.
14:00	
14:30	
15:00	
15:30	
16:00	
16:30	
17:00	
17:30	
18:00	

Comments:

Temperature Range: 50 -- 66 ^{0} F

Weather Conditions: Rain

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Field Operations Supervisor Signature

08/11/14 LC39A 112GOC925

Personnel :	Chuck Sarden (CS)	Geologist	T+
	Dave Longino (DL)	Driller	GPI
	Jeff Ziegler (JZ)	Helper	GPI
	Forrest Leeper (FL)	Helper	GPI

Weather : Sunny 80°F

PPE : Level D

Vehicle : 2006 F-250 (T+)

Health & Safety (HAS) : Topics – PPE
– SSHASP
– Inclement weather

Objective : Begin AS well install

0715 CS arrives @ Badging office; CS receives call from DL; F did not Bring 2 forms of ID; GPI running Late

0915 GPI @ Badging office F getting badge

0930 Depart for LC39A

0950 Arrive; Attending SpaceX HAS meeting

1120 meeting Concluded; moving into Pad to unload; then GPI going to lunch at Getting water

1135 GPI offsite

1200 Phase II

1345 Spoke w/ Chris Pine (CP) – Project Manager; CS spoke w/ CCAFS weather; not coming out of Phase II for several more hours, working abandoned for the day

1400 Site Secured; all offsite

C.S.

08/11/14

Scale: 1 square =

08/12/14 LC31A 112606925

Personnel : Chuck Sorden (CS) Geologist T+
Dave Longino (DL) Driller GPI
Jeff Ziegler (JZ) Helper GPI
Forrest Leeper (FL) Helper GPI

weather : Sunny 70°F
PPE : Level D
Health & Safety (HAS) : Topics – PPE
– Smoking
– Utilities clearance
vehicle : 2006 F-250 (T+)
Objective : Begin AS well install

[redacted] CS, GPI on site; HAS meeting
[redacted] Enter Pad A; unloading rig, equipment; tooling, etc
[redacted]20 Set up on AS0085; hand clear 5' for utilities clearance
[redacted]35 Drilling Commenced
[redacted]0C Setting well 37' TD
[redacted]15 Well set; hydrating bentonite
[redacted]25 Grouting Accurate
[redacted]50 Installation Complete
[redacted]0C Drilling AS0090; location previously hand cleared
[redacted]0 Setting well
[redacted] Well Set; hydrating bentonite
[redacted] Apron in complete; grouting beneath
[redacted]5 Installation complete
100 Drilling AS0094; Location previously hand cleared
115 Setting well; 37' TD
125 Well set; hydrating bentonite; GPI offsite to get water for rig
225 GPI on site; grouting beneath
[redacted]5 Installation complete
[redacted]45 Set up on AS0098; hand clear five feet for utilities clearance
310 Setting well 37' TD
(320
[redacted] well set hydrating bentonite; Billy Moss (BM); Thomas Watson (TW) & Kyle Degler (KY) on site w/ GPI; HAS meeting; unloading rig
[redacted]0 DL Grouting Accurate
355 Installation Complete
(405 DL Drilling AS0102; location previously hand cleared
425 Setting well
435 Well Set; hydrating bentonite; DL Watering Truck for Rig
440 BM set up on AS0100; hand clear 5' for utilities clearance
450 Drilling Commenced

08/12/14

08/12/14 LC39A 1126062 S

1500 Ok Grouting Bore hole

1515 Installation Complete on AS0102; BM Setting AS0100

1520 DL set up on AS0105 ; hand clear 5' for utilities clearance

1550 AS0100 Set; developing while bentonite hydrates; DL Drilling AS0105

1550 Development/hydration complete on AS0100; grouting Borehole; Setting AS0105

1605 Installation complete on AS0100; AS0105 Set; hydrating bentonite on AS0105

1610 BM set up on AS010 ; hand clear 5' for utilities clearance

1620 hydration complete on AS0105; grouting borehole ; BM Drilling AS0104

1630 Installation Complete on AS0105

1635 Set up on AS0106; location previously hand augered

1640 Ok Drilling AS0106; BM Setting AS0104

1640 AS0104 being Set

1650 AS0104 Set; hydrating bentonite/ Developing. Setting AS0106 @ 16 55

1705 hydration Complete grouting AS0104; AS0106 set; hydrating bentonite

1715 Installation Complete on AS0104

1720 Ok Drilling AS0108 ; location previously hand cleared

1730 Setting AS0108 ; Grouting AS0106

1745 Installation Complete on AS0106; AS0108 set; will grout tomorrow

1800 Site Secured; all offsite

C.S.

08/12/14

Scale: 1 square =

08/13/14 LC39A 12600925

Personnel :	Chuck Sorden (CS)	Geologist	TT
	Dave Longino (DL)	Driller	GPI
	Jeff Ziegler (JZ)	Helper	GPI
	Forest Keeper (FK)	Helper	GPI
	Billy Moss (BM)	Driller	GPI
	Thomas [illegible] (TW)	Helper	GPI
	Kyle Degler (KD)	Helper	GPI

weather : Sunny 77°F

PPE : Level D

Vehicle : 2006 F-250 (TT)

Health & Safety (H&S) : Topics – PPE
– Smoking
– Inclement weather

objective : Continue AS well install

0700 CS, GPI on site watering trees; H&S meeting

0715 Enter Pad A; Prepping for today

0730 BM developing AS0108

0745 Development complete; grouting AS0108; DL Drilling AS0109; location previously hand cleared

0815 Installation Complete on AS0108

0905 BM drilling AS0111

0910 DL setting AS0109

0920 AS0109 Set; hydrating Bentonite; setting AS0111

0935 AS0111 Set; hydrating bentonite / Developing

0940 Installation complete; grouting AS0109

0950 Installation complete on AS0109; Installation complete; grouting AS0108

0900 Installation complete on AS0111; DL drilling AS0103

0905 BM Drilling AS0110

0915 Setting AS0103

0925 AS0103 Set; hydrating; BM setting AS0110

0935 AS0110 Set; hydrating / developing

0940 Grouting AS0103

0950 Grouting AS0110; Installation complete on AS0103
Exit DL Drilling AS0096 (moved 3' N to new unit)

1000 Installation complete on AS0110; DL Drilling AS0096

1005 BM Drilling AS0107

1025 DL Setting AS0096

1025 AS0096 Set; hydrating bentonite; getting water for rig; BM setting AS0107

1035 well set; developing / hydrating; getting water for rig

1055 Grouting AS0096 & 107

08/13/14

Scale: 1 square

08/13/14 LC34 112G0925

1105 AS 0107 Install complete on AS0096
1115 DL Drilling AS0099 and AS0112 (BM)
1130 Setting AS0099 and 112
1140 Wells Set and hydrating
1150 BM, TW, KD offsite for lunch
1200 DL Grouting AS0099
1216 Installation Complete
1220 Set DL Set up on AS0095; DL, JZ, FL offsite for lunch
1300 BM, TW, KD on site; grouting AS0112
1315 DL, JZ, FL on site; ~~grout~~ drilling AS0095; BM set up on AS0113
1325 BM Drilling AS0113
1330
1335 DL Setting AS0095; moved 2' South for utilities clearance
1340 BM setting AS0113; AS0095 Set; Hydrating
1350 AS0113 set; hydrating/developing
1355 Grouting AS0095
1405 Installation complete on AS0095
1415 DL Drilling AS0091 (location previously hand cleared); BM Grouting AS0113 @ 1410
1425 BM Drilling AS0114
1430 Setting AS0091
1440 well set; hydrating bentonite; setting AS0114
1500 Grouting AS0091; AS0114 set @ 1450; BM getting water for rig
1510 Installation complete on AS0091
1515 Drilling AS0088 to set @ 53.7° 45.9'; BM Grouting AS0114
1535 Installation Complete on AS0114
1580 BM Drilling AS0115
1540 BM Setting AS0115; Setting AS0088
1545 AS0115 Set; hydrating
1550 AS0088 Set; hydrating
1600 Grouting AS0116
1610 Installation Complete
1615 Drilling (BM) AS0116
- Phase II personnel served
1730 Site Secured; All offsite

C.S.

08/13/14

Scale: 1 square =

05/14/14 LC39A 1260925

Personnel :	Chuck Sorden (CS)	Geologist	T+
	Dave Langmo (DL)	Driller	GPI
	Jeff Ziegler (JZ)	Helper	GPI
	Ernest Leeper (EL)	Helper	GPI
	Billy Moss (BM)	Driller	GPI
	Thomas Watson (TW)	Helper	GPI
	Kyle Degler (KD)	Helper	GPI

Weather : Sunny 77°F

PPE : Level D

Health & Safety (H&S) : Topics – PPE, IDLH, Inclement Weather

Vehicle : 2006 F-250 (T+)

Objective : Continue MS well install

1700 All onsite; H&S meeting/enter PAD A; Prep for today

720 BM Drilling AS0116; DL Grouting AS0088

740 BM Setting AS0116; Install when complete on AS0088

800 DL Drilling ~~AS0101 to set @ 63.2° 41.5'; BM Grouting AS0116~~
AS0097 43.2° 54'

805 BM Set AS0116 (Screen Broke); hydrating / Developing

820 Grouting AS0116

825 AS0116 Came up During grout; ~~re-drilling~~ boring abandoned; will move 3' & re drill later

845 ~~BM~~ Drilling AS0118

855 BM Setting AS0118

905 well set; hydrating/developing; DL offsite to get water; having issues getting depth

920 Hydration Complete; grouting well

930 Installation Complete

935 BM Drilling AS0121

945 BM setting AS0121

950 AS0121 Set; hydrating

000 Setting AS0097

~~0820~~ AS0097 Set hydrating; grouting AS0121

020 Installation Complete on AS0121

023 Drilling AS0122 (BM)

040 Setting AS0122; grouting AS0097

050 AS0122 Set; hydrating

100 Installation complete on AS0097

110 DL Set up on AS0101 to set @ 63.20° 41.5'

120 Drilling AS0101

25 BM Grouting AS0122

130 Installation Complete on AS0122

08/14/14

Scale 1 square =

08/14/14 LC39A 1260925

1146	Screen Broke on AS0[illegible] During pipe extraction; will reinstall later
1150	Setting AS0101; BM Drilling AS0120
1200	Setting AS120 ; AS0101 Set; Hydrating
1210	AS0120 Set; hydrating
1220	Grouting AS0101; BM Crew offsite for lunch
1230	Installation Complete on AS0101; DL crew offsite for lunch
1315	DL crew on site; moving to new area
1330	BM crew on site; phase II; all personnel secured
1400	Phase II canceled; BM Grouting AS0120; DL Setup on AS0066
1415	AS0120 complete
1420	BM Drilling AS0117
1430	Setting AS0107
1440	AS0117 Set; hydrating; Drilling AS0066
1455	Grouting AS0117
1506	well stopped screen again on AS0117; phase II
1730	Site Secured; all offsite

C.S.

08/14/13

Scale: 1 square =

08/15/14 LC39A 12GOC925

Personnel :	Chuck Sorden (CS)	Geologist	T+
	Dave Longino (DL)	Driller	GPI
	Jeff Ziegler (JZ)	Helper	GPI
	Frankie Leeper (FL)	Helper	GPI
	Billy Moss (BM)	Driller	GPI
	Thomas Watson (TW)	Helper	GPI
	~~Kyle Dayton (KD)~~	~~Helper~~	~~GPI~~

Weather : Sunny 74°F
PPE : Level D
(Health & Safety (HAS) : Topics - PPE, inclement weather, heat stress
Vehicle : 2006 F-250 (T+)
objective : Continue AS well install

2645 CS onsite
1700 GPI onsite; HAS meeting; Enter Pad A; prep for today
1720 DL continuing drilling on AS0085
730 BM Drilling AS0119
740 DL setting AS0085; BM setting AS0
1250 wells set; hydrating
1405 Hydration complete; grouting wells
1515 Installation complete on AS0085
520 AS0119 snagged..... again
1525 DL Drilling AS0087
1550 BM Drilling AS0118 Again; moved 2' North
1620 Grouting wells
1700 wells set; hydrating
1815 hydration complete; grouting wells
1825 Installation Complete on AS0119 at AS0087
1840 ~~BM Drilling AS0122; moved 2' to, 2' S~~ DL Drilling AS0092 to set @ 65.7° 40.6'; moved 2' E to avoid utilities; Well became snagged (AS0118) at pulled again calling Chris Pike (PM) to discuss
[illegible] BM Drilling AS0122 (moved 2' S);
000 setting wells AS0122
010 wells set; hydrating
030 BM Grouting AS0122; DL setting AS0092
040 AS0092 set; hydrating; installation complete on AS0122
055 BM Drilling AS0119 (moved 8' North); DL Grouting AS0092
105 Installation Complete on AS0092; Setting AS0119
125 AS0119 Set; Hydrating Drilling AS0093
140 Grouting AS0119; setting AS0093
150 Installation Complete on AS0119

08/15/14

cale: 1 square =

08/15/14 LC3-A 12G0625

1155 BM drilling AS0117 (moved 2' W at 2' N); AS0093 set
1200 Phase II; all personnel secured; GPI taking lunch
1230 Phase II terminated; correction, back in phase II
1300 Phase II terminated
1305 GPI on site; DL Grouting AS0093; BM setting AS0117
1315 well set; hydrating
1320 Installation complete on AS0093; Phase II
1530 Site Secured; All offsite

C.S.

08/15/14

08/18/14 LL39A 12600225

Personnel : Chuck Sorden (CS) Geologist T+
Dave Longino (DL) Driller GPI
Jeff Ziegler (JZ) Helper GPI
Ernest Leeper (EL) Helper GPI
Billy Moss (BM) Driller GPI
Thomas Watson (TW) Helper GPI
weather : Sunny 91°F
PPE : Level D
vehicle : 2006 F-250 (T+)
Health & Safety (H&S) : Topics — PPE, Heat Stress; weather
Objective : Continue AS well install

[illegible] CS on site
[illegible] CS calls DL; GPI running late
[illegible] GPI on site; H&S meeting; prepping for today/wk; GPI mechanic repairing [illegible]
[illegible] BM Grouting AS0117; Bob Cat repaired
[illegible] Installation Complete on AS0117
[illegible] BM Drilling AS0116 (moved 1.5' West)
[illegible] DL Drilling AS0001; BM Setting AS0116
[illegible] [illegible] Set; hydrating
[illegible] Setting AS0001; Grouting AS0116
[illegible] Installation Complete on AS0116; AS0001 Set; hydrating
[illegible] Grouting AS0001; BM Set up on AS0016, hand augur clear 5' for utilities clearance
[illegible] Installation complete on AS0001; Drilling AS0016
[illegible] DL Drilling AS0002; Setting AS0016
[illegible] AS0016 Set; hydrating
[illegible] Setting AS0002; grouting AS0016
[illegible] AS0002 Set; hydrating; Installation complete on AS0016
23 BM Set up on AS0017
30 BM Drilling AS0017
35 DL Grouting AS0002
40 Setting AS0017; Installation on AS0002 Complete
150 AS0017 Set; hydrating; DL Crew offsite for lunch
105 Grouting AS0017
215 Installation complete on AS0017
220 Set up on AS0018
225 Drilling AS0018
235 Setting AS0018
245 AS0018 Set; hydrating; BM Crew offsite for lunch
300 DL crew on Site

Scale: 1 square = [illegible]

08/18/14

06/18/14 LC35A 112G0G925

1215 DL Drilling AS0003
1330 BM crew on site; Grouting AS0018
1340 DL setting AS0003
1345 Installation on AS0018 complete
1350 BM setup on AS0012; DL rig Down; repairing; bolt sheared
1400 BM Drilling AS0012
1410 DL rig repaired; BM setting AS0012
1415 AS0003; set hydrating
1430 Grouting AS0003 AS 0012 sealed, 420
1435 BM Grouting AS0012
1445 Installation Complete on AS0012; DL Drilling AS0004 (moved 1.6' S of is near vertical due to utilities
1450 BM Drilling AS0013
1515 DL setting AS0004; Setting AS0013
1525 AS0013 Set; hydrating on AS0004
1540 Grouting AS0013 and AS0004
1550 Installation Complete on AS0013 and AS0004
1555 DL Drilling AS0005 tored @ 48.70-49.2'; BM Drilling AS0014 (moved 2' S)
1615 BM setting AS0014
1625 AS0014 Set; hydrating
1630 DL Getting water for rig
1650 Phase II
1720 End Second; all offsite

C.S.

06/18/14

Scale: 1 square =

06/19/14 LC39A 12606925

Personnel :	Chuck Sarden (CS)	Geologist	TT
	Dave Longino (DL)	Driller	GPI
	Jeff Ziegler (JZ)	Helper	GPI
	Forest Leeper (FL)	Helper	GPI
	Billy Moss (BM)	Driller	GPI
	Thomas Watson (TW)	Helper	GPI

Weather : Sunny 79°F
PPE : Level D
Vehicle : 2006 F-250 (TT)
Health & Safety (HAS) : Topics – PPE, EOW, heat stress
Objective : Continue AS well install

0550 CS/GPI on site; HAS meeting; PAD A on lockdown for unknown reason
0750 Lockdown removed; enter Pad A; prep for today
0805 DL Resuming drilling on AS0005; BM Grouting AS0019
1013 Installation Complete on AS0044
1023 BM Drilling AS0045
1140 BM setting AS0045
1200 AS0045 Set; hydrating; setting AS0005
1300 AS0005 Set; hydrating; grouting AS0045
1415 Installation complete on AS0045
1505 BM Drilling AS0044 Grouting AS0005; AS0044 moved 1' N for utilities clearance
1540 BM setting AS0044
1600 DL Drilling AS0006; AS0044 Set; hydrating DL getting water
1655 Grouting AS0044
0015 Installation Complete on AS0044
0200 DL Drilling AS0006
0400 BM Drilling AS0051
0445 Setting AS0006
0555 AS0006 Set; hydrating
0600 Setting AS0051
1610 Grouting AS0006; Setting AS0051
1700 Installation Complete on AS0006; AS0051 Set; hydrating BM even getting lunch
1705 Drilling AS0009 tosed @ 72.3° 38.8'
2300 Setting AS0009
0105 AS0009 Set
0215 BM on Site
0220 Grouting AS0009
0300 Installation Complete on AS0009 & AS0051; DL offsite for lunch
2400 BM Drilling AS0042
2530 BM setting AS0042

Note: 1 square = _____

CB/M/M

06/19/14 LC39A 112 GOC926

1306 AS0042 Set; hydrating
1320 DL Drilling AS0007 to Set @ 55.3° 45'; BM grouting AS0042
1330 AS0042 Install complete
1340 BM Drilling AS0043; DL setting AS0007
1350 Setting AS0043
1400 AS0043 Set; hydrating; AS0007 Set
1415 Grouting AS0043 and AS0007
1425 Installation Complete on AS0007 and AS0043
1435 BM Drilling AS 0052; DL Drilling AS0008
1450 Setting AS00 52 and AS0008
1500 Wells Set; hydrating
1515 DL Grouting AS0008
1520 BM Grouting AS00 52
1535 Installation Complete on AS0008
1530 DL Drilling AS0014
1540 BM Drilling AS0059
1545 Setting AS0014
1555 AS0046 Set; hydrating
1600 BM Setting AS0059
[illegible] AS0059 Set; hydrating
1625 Grouting AS0014 and S9
1635 Installation Complete on AS00M and S9
1645 BM Drilling AS00C3; DL Drilling AS0015 (moved 1.5' SE)
1655 BM setting AS00C3
1705 AS00C3 Set; hydrating; Setting AS0015
1715 AS0015 Set; hydrating
1720 Grouting AS00C3
1730 Installation Complete on AS00C3; Grouting AS0015
1740 Installation Complete on AS0015
1800 Site Secured; All offsite

C.S.

08/19/14

ALL WEATHER WRITING PAPER
Scale: 1 square =

08/20/14 LC39A 112G0592S

Personnel : Chuck Sorden (CS) Geologist Ty
Dave Longino (DL) Driller GPI
Jeff Ziegler (JZ) Helper GPI
Forest Leeper (FL) Helper GPI
Billy Moss (BM) Driller GPI
Thomas Watson (TW) Helper GPI

Weather : Sunny 80°F
PPE : Level D
Vehicle : 2006 F-250 (T4)
Health & Safety (HAS) : Topics - PPE, Heat, IDLH
Objective : Continue AS well install

0630 CS, GPI on site; HAS meeting; prep for today
0720 BM Drilling AS0071; DL Drilling AS0010
0735 BM Setting AS0071
0743 AS0071 Set; [illegible]
0830 Grouting AS0071; DL Setting AS0010
0910 Installation complete on AS0071
0915 AS0010 Set; grouting; BM Drilling AS0058
0933 Setting AS0058; grouting AS0010
0955 AS0058 Set; hydrating; Grouting/Install complete on AS0010
1000 DL Drilling AS0050; BM Grouting AS0058
1030 Installation complete on AS0058
1120 Set up (BM) on AS0020
1130 BM Drilling AS0020
1240 BM Setting AS0058
1245 BM Setting AS0020
1350 AS0058 Set; hydrating
1525 BM and DL Grouting AS0020 and 58
1535 Install stems complete on AS0020 and 58
1615 DL Drilling AS0018 (moved 6' SE) to set @ 62.5°, 41.7'; BM Drilling AS004C
1705 BM Setting AS004C
1710 AS004C Set; hydrating; Setting AS0011
1735 Setting AS0011
1830 Grouting AS004C; Nick Stringham (NS) on site; HAS Briefing
1855 AS0011 Set; hydrating
1940 Installation complete on AS004C
2050 Grouting AS0011; BM Drilling AS0047
2100 Installation Complete on AS0011; Setting AS0047
2110 AS0047 Set; hydrating
2115 GPI offsite for lunch

scale 1 square =

08/20/14

05/20/14

112G-0925

1315	BM Grout on site
1320	Drilling AS0047; DL Grout on site
1330	Installation of AS0047 Complete; DL Drilling AS0053
1340	BM-Drilling AS0048
1350	Setting AS0048
1400	AS0048 Set; hydrating
1405	Setting AS0053
1415	Grouting AS0048
1420	Grouting AS0053
1425	Installation complete on AS0048
1430	Installation Complete on AS0053; BM Drilling AS0049
[illegible]	DL Drilling AS00CB
[illegible]	Setting AS0049
[illegible]	AS0049 Set; hydrating
[illegible]	Setting AS00CO
[illegible]	AS00CO Set; BM Grouting AS0049
[illegible]	Installation Complete on AS0049
[illegible]	BM Drilling AS005C
[illegible]	DL Grouting AS00CO
[illegible]	BM Setting AS005C; Install complete on AS00CO
[illegible]	AS005C Set; hydrating; ~~DL Drilling AS00C7~~
1610	Grouting AS005C; DL Drilling AS00C7
1620	Installation complete
1625	BM Drilling AS0057
1635	Setting AS0057
1640	DL Setting AS00C7
1645	AS0057 set
1650	AS00C7 set
1700	Grouting AS0057
1705	Grouting AS00C7
1710	Installation Complete on AS0057
1715	Installation Complete on AS00C7
1730	Site Secure; all offsite

E.S.

05/20/14

Scale: 1 square =

08/21/14 LC39A 1126806925

Personnel :	Chuck Sardon (CS)	Geologist	T+
	Dave Longino (DL)	Driller	GPI
	Jeff Ziegler (JZ)	Helper	GPI
	Ernest Leeper (FL)	Helper	GPI
	Billy Moss (BM)	Driller	GPI
	Thomas Watson (TW)	Helper	GPI
	Nick Springham (NS)	Helper	GPS

weather : Sunny 79°F
PPE : Level D
Vehicle : 2006 F-250 (T+)
Health & Safety (HAS) : Topics - PPE; heat stress; weather
objective : Continue AS well install

0650 CS, GPI on site; HAS meeting; Prep for today
0705 BM Drilling ~~AS0064~~ DL Drilling ~~AS0064~~ AS0072
0725 Setting AS0055
0745 Setting AS0072; AS0055 Set; hydrating
0745 AS0072 Set
0930 Grouting AS0055
0800 Grouting AS0072; AS00 55 Complete
1510 AS0072 complete; BM Drilling
0915 BM Drilling AS0077
0940 Setting AS0062
0930 AS0062 Set
0745 Grouting AS0062; Setting AS0077
0855 AS0077 Set; hydrating; Install complete on AS 0062
0900 BM Drilling AS0064; NS clearing AS0065; moved 6' SE to avoid utilities
0910 Setting AS 0064
0920 AS 0064 Set; hydrating; grouting AS0077
0940 Installation complete on AS0077
~~0950~~ DL Drilling MW-B
0930 BM Grouting AS0064
1000 AS0064 install complete
~~1000~~ DL Drilling MW B; BM Drilling AS0065
1010 DL Setting MW-B
1020 BM setting AS0065; MW B Set; grouting
1035 AS0065 Set; hydrating; DL Drilling AS0073
1050 DL Setting AS0073
1100 AS0073 Set; hydrating
1105 BM Grouting AS0065
1115 Install complete on AS0065; DL Grouting AS0073

Scale: 1 square = ____

08/21/14

05/21/14 — LC39A — 12GOC925

1126	BM drilling AS00CC
1125	Install complete on AS0073
1130	DL crew offsite for lunch; BM setting AS00CC
1140	AS00CC set; BM crew offsite for lunch
1230	GPI on site
1245	DL Drilling AS00C9 to set ④ 68.6°, 39.7' (mead 14.5' Away); BM Grouting AS00CC
1255	Installation Complete on AS00CC
1300	BM Drilling AS0054
1310	Setting AS0054 at C9
1320	Wells set; hydrating
1335	Grouting wells
1345	Installations Complete
1350	BM Drilling AS00 C7
1400	DL Drilling; MW-A Setting AS00C7
1410	AS00C7 set; Setting MW-A
1425	Grouting AS00C7 ~~AS00C8~~
1435	Installation Complete on AS00C7; AS MW-A set; grouting
1440	Drilling AS00C8 Installation complete on ~~AS00~~ MW-A
1450	Setting AS00C8
1500	AS00C8 set; hydrating; DL grating set up on top of camera pad
1515	Grouting AS00C8
1525	Installation Complete on AS00C8
1535	DL Drilling AS0080 to set ④ 48'
1540	BM Drilling AS0054
1550	BM Setting AS0054
1555	Setting AS0080
1600	AS0054 set; hydrating
1605	AS0054 set; hydrating
1615	BM Grouting AS0054
1620	DL Grouting AS0080
1625	AS0054 Complete
1630	AS0080 Complete; Conducting site maintenance
1730	Site Secured; all offsite

C.S.

05/21/14

Scale: 1 square =

26/03/14 — LOG A — 1260725

Personnel :	Chuck Sorden (CS)	Geologist	TT
	Dave Longino (DL)	Driller	GPI
	Jeff Ziegler (JZ)	Helper	GPI
	Forest Leeper (FL)	Helper	GPI
	Billy Moss (BM)	Driller	GPI
	Thomas Watson (TW)	Helper	GPI
	Nick Stringham (NS)	Helper	GPI

Weather : Sunny 80°F
PPE : Level D
Vehicle : 2006 F-250 (TT)
Health & Safety (HAS) : Topics - PPE; heat; demob
Objective : Continue AS well install

0700 CS, GPI on site; HAS meeting; prep for today
0715 BM Drilling AS0063; DL prepping to top off some low wells w/ Grout
0725 Setting AS0053
0735 AS0063 Set; hydrating; DL topping off wells
0750 Grouting AS0053
0800 Installation complete on AS0053
0803 BM Drilling AS0081
0815 Setting AS0081
0825 AS0081 Set; hydrating
0830 DL Set up on AS0070 (moved 2' SW for gas stability)
0845 BM Grouting AS0081 & DL Drilling AS0070 @ 0840
0900 BM Drilling AS0082; DL Setting AS0070 @ 47'
0910 AS0070 Set; Setting AS0082
0920 AS0082 Set; hydrating
0925 Grouting AS0070
0935 Grouting AS0082; Install complete on AS0070
0945 Install complete on AS0082
0955 BM Drilling AS0085; DL Drilling AS0075
1005 BM Setting AS0085
1015 AS0085 Set; hydrating; Setting AS0075
1025 AS0075 Set; hydrating; Grouting AS0085
1035 Install complete on AS0085
1040 DL Grouting AS0075
1050 Install complete on AS0075.
1115 BM Drilling AS0041; DL Crew offsite for lunch
1125 Setting AS0041
1135 AS0041 Set; BM crew lunch
1215 DL Crew on Site

06/22/14

Scale: 1 square =

05/22/14 LC39A 112-0C925

1225 DL Drilling AS0078
1230 BM crew on site
1235 BM Grouting AS0047 (should have been set @ 38'); Setting AS0078
1255 Install Complete on AS0041; AS0078 set; hydrating
1305 BM Drilling AS0040
1315 Grout Setting AS0040
1325 AS0040 Set; Grouting AS0078
1335 Installation Complete on AS0078
1340 Grouting AS0040
1350 Installation of AS0040 Complete
1400 Drilling (BM) AS0039; DL Drilling AS0079 to 40'
1415 BM Setting AS0039; DL setting AS0079
1425 Wells set; hydrating
1440 BM Grouting AS0039
1445 DL Grouting AS0079
1450 Installation of AS0039 Complete; Begin Demob of BM crew
1500 AS0079 Complete; DL crew topping off wells w/ Grout / dead spiking
1630 Site Secured; all offsite

C.S.

M02

05/22/14

06/25/14 LCSS 12GOC925

Personnel : Chuck Sorden (CS) Geologist TT
Dave Longino (DL) Driller GPI
Thomas Watson (TW) Helper GPI
Weather : Sunny, windy 78°F
PPE : Level D
Vehicle : 2006 F-250 (TT)
Health & Safety : Topics — Heat; PPE; rig safety
Objective : Continue AS well install

0730 CS, GPI on site; H&S meeting; prep for today
0800 Setup on AS0075 (moved 10' SE) no set @ 42' BLS
0815 Drilling commenced
0850 Setting well
0900 well set; hydrating
0915 Grouting well
0930 Installation complete
1000 Drilling AS0074; Set @ 44' BLS
1020 Setting well
1030 well set; hydrating
1100 Grouting well
1130
1200 GPI offsite for lunch
1300 GPI on site
1310 Drilling AS0038 to set @ 52° 47.3'/depth (added 1' per Chris Pike rec.)
1335 Setting AS0038
1340 AS0038 set; hydrating
1400 Grouting
1420 Installation complete
1433 Drilling AS0037
1450 Setting AS0037
1500 Set; hydrating
1520 Grouting AS0037
1535 Install complete
1545 Drilling AS0033 to set @ 77.9° 37.8'/depth
1605 Setting AS0033
1620 AS0033 set; hydrating
1635 Hand Complete; grout
1650 Installation Complete
1730 Site Secured; all offsite

06/25/14

08/26/14 — LG39A — 1126OC935

Personnel :	Chuck Sorden (CS)	Geologist	T+
	Dave Longino (DL)	Driller	GPI
	Thomas Watson (TW)	Helper	GPI

weather : Sunny, windy 76°F
PPE : Level D
vehicle : 2006 F-250 (T+)
Health & Safety (HAS) : Topics - PPE, utilities, IDW
objective : Continue AS well install

0700 CS, GPI on Site; HAS meeting/prep for today
0730 Set up on AS0032; hand clearing
0750 Drilling Commenced
0805 Setting well
0815 Well set
0830 Grouting
0840 Installation Complete
0855 Set up on AS003C to set @ 75.2°, 39.3' (+1')
0905 Drilling Commenced
0930 Setting well
0940 Well set; hydrating
0955 Grouting AS0036
1005 In Complete
1020 Set up on AS0035
1035 Drilling commenced
1115 Setting well
1125 Well set; hydrating
1145 Grouting well
1200 Installation Complete; GPI offsite for lunch
1300 GPI on site
1325 Drilling AS0031
1400 Setting well
1410 Well set; hydrating
1425 Grouting well
1435 Installation Complete
1450 Drilling AS0030
1550 Setting AS0030
1605 Well set; getting water
1645 Grouting well
1700 Install complete; Setting up on 1500
1730 Site Secured; all offsite

08/26/14

08/27/14 LL300 112606525

Personnel :	Chuck Sorden (CS)	Geologist	T+
	Dave Longino (DL)	Driller	GPI
	Thomas Watson (TW)	Helper	GPI

Weather : Partly Sunny 77°F
PPE : Level D
Health & Safety (HAS) : Topics - PPE, IDW, weather
Vehicle : 2006 F-250 (T+)
Objective : Continue AS well install

0650
0700 CS, GPI onsite; HAS meeting; prep for today
0735 DL Drilling AS0024
0825 Setting well
0840 Well set; hydrating
0900 Grouting well
0910 Installation complete
0928 Drilling AS0029
1005 Setting well
1015 Well set; hydrating
1035 Grouting well
1045 Install complete; getting water
1120 Drilling AS0028 to set @ 70.1 40.4'
1210 Setting well
1225 Well set; hydrating
1240 Grouting
1250 Installation Complete
1300 ~~Drilling AS0023~~ GPI taking lunch
1400 GPI on site
1405 Drilling AS0023
1440 Setting well
1450 well set
1505 Grouting well
1515 Installation Complete
1520 Drilling AS0022
1540 Setting well
1550 Well set; getting water for rig
1610 Grouting well
1620 Install complete
1625 Drilling AS0021 to Set @ 840 34.2'
1800 Setting well
1710 well set
1725 Grouting well

Scale: 1 square = _____

08/27/14

08/27/14 LC39A 112G0623

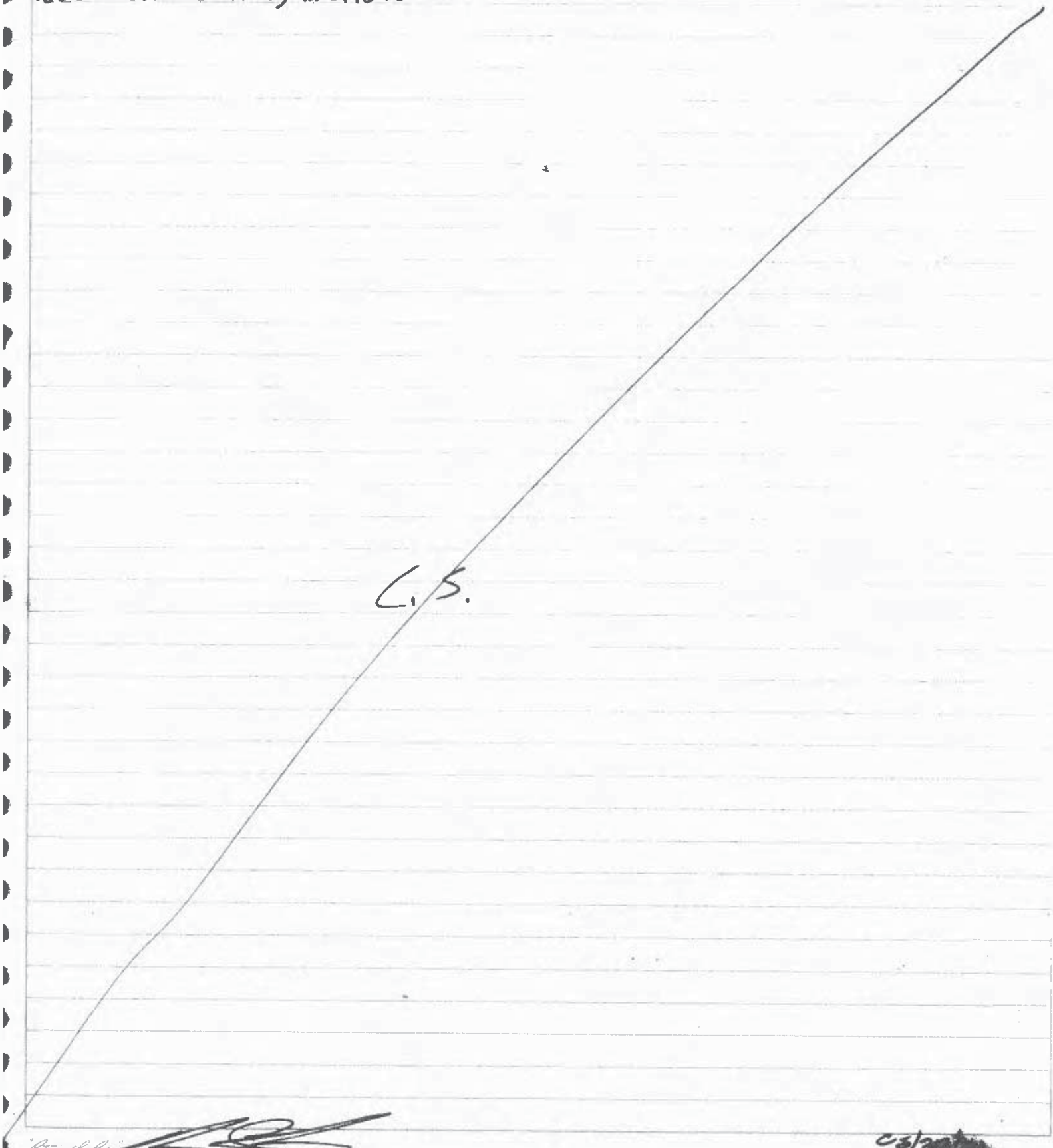
1735 Installation complete; rig drilling ASOO38; well broke during installation and was discovered today during development; moved 2' W

1745 Drilling Commenced

1815 Out of water; will finish tomorrow

1830 Site secured; all off site

L.S.



Scale: 1 square =

05/25/14 LC394 112606023

Personnel : Chuck Sorden (CS) Geologist TT
Dave Longino (DL) Driller GPI
Thomas Watson (TW) Helper GPI
Weather : Sunny 72°F
PPE : Level D
Vehicle : 2006 F-250 (TT)
Health & Safety (HAS) : Topics - PPE, Demob, IDW
Objective : Complete AS well install and Demob

0700 CS, GPI on site; HAS meeting; prep for today
0735 Drilling resumed on AS0038
[redacted] Setting well
0810 well set; hydrating
0830 Grouting well and abandoning old well
0830 Fit installation complete; moving to other side of Cable gantry
0920 Drilling AS0034
0940 Setting well
0950 well set
[redacted] Grouting well
0420 Installation Complete
[redacted] Drilling AS0084
[redacted] Setting well
[redacted] well set; hydrating
[redacted] Grouting well
[redacted] Install complete
[redacted] Drilling
[redacted] Setting well
[redacted] well set; hydrating
[redacted] Grouting well
[redacted] Installation Complete
1345 Drilling AS0025 tuser @ 74.2° 38.5' Length
1410 Setting well
1423 well set; hydrating
1440 Grouting well
1450 Installation complete; Begin Demob
1645 Demob complete; All offsite

C.S.

Scale: 1 square = [redacted]

05/25/14

APPENDIX C

KSC ENVIRONMENTAL CHECKLIST AND MONITORING WELL PERMITS

PROVIDED IN ELECTRONIC VERSION ONLY

Avoid Verbal Orders

TO: Mike Deliz, TA-A4B, 321-867-6971 **DATE:** 5/2/2014

FROM: TA-A4C/Environmental Management Branch

SUBJECT KSC Record of Environmental Consideration (REC) **REC #:** 9294

1. PROJECT INFORMATION

Project Title: Interim Measure Air Sparging System and Soil Excavations at Launch Complex 39A

Project Lead: Chris Pike, TetraTech, 321-921-8861 **Directorate Project No.:** LC39A -5-2-2014

Project Description The purpose of the interim measure treat volatile organics in groundwater in two area of the pad. The air system expansion will include installation of 124 air sparge wells that will be finished flush to the ground surface and all associated underground piping (Figure 1). Two monitoring wells will be installed (Figure 3) at two locations to complement the existing monitoring well network to monitor remedial effectiveness (in-situ air sparging). The remedy will remain in-place until remediation goals are achieved.

In addition, there are 43 areas of soil contamination that warrant excavation (Figure 2). These areas will be excavated and the the soil will be disposed of according to existing regulations. The contamination is mostly inorganics, petroleum products and very low levels of PCBs.

EPB Reviewer: JSS **Facility No.:** LAUNCH COMPLEX 39A (SWMU #8)

2. NEPA DETERMINATIONS

- ☐ **a. Categorical Exclusions per 14 CFR Part 1216.304(d**
- ☐ **b. Environmental Assessment (EA) Required**
- ☐ **c. Environmental Impact Statement (EIS) Required**
- ☐ **d. Existing FONSI or ROD**
- ☐ **e. Centerwide EIS**
- ☐ **f. AF Project on KSC/813**
- ☐ **g. NASA Project on CCAFS/813**

3. ENVIRONMENTAL REQUIREMENTS

a. Non-Permit Requirements	☑ **YES**	☐ **NO**
b. Permit Requirements	☑ **YES**	☐ **NO**

2.a.1. CATEGORICAL EXCLUSION (CATEX): This project is categorically excluded (CATEX) from further NEPA review as defined in 14 CFR 1216.304(d)(2)(i) Routine maintenance, minor construction or rehabilitation, minor demolition, minor modification, minor repair, and continuing or altered operations at, or of, existing NASA or NASA-funded or -approved facilities and equipment, such as buildings, roads, grounds, utilities, communication systems, and ground support systems, such as space tracking and data systems. For additional information, please contact Don Dankert of the NASA Environmental Management Branch (TA-A4C, 321- 861-1196).

3.a.1. SOLID WASTE MANAGEMENT UNIT (SWMU): This project is located within the boundary of SWMU #8 (Launch Complex 39A) being investigated by the Remediation Group of the Environmental Assurance Branch. A SWMU designation means a site has had historical operations with the potential to impact the environment. A Land Use Control Implementation Plan (LUCIP) has been prepared for this area to protect human health against contaminated groundwater. These controls are necessary to prohibit the use of groundwater. All workers involved in subsurface/dewatering work must be notified (HAZCOM) of the potential for contamination present and it is recommended that an Industrial Hygienist be consulted for determination of required personal protective equipment (PPE). Contact your company's Safety and Health Office for recommendations on personal protective equipment (PPE).

NOTE: Existing monitoring wells could also be in the work area and must be avoided. Contact the Remediation Project Manager (Mike Deliz, TA-A4B, 321-867-6971) with any questions about possible well relocation if required, and specific guidance regarding handling of soil and/or groundwater at this site.

3.a.2. HAZARDOUS/NON-HAZARDOUS WASTE: All hazardous waste and non-hazardous wastes generated on KSC (including investigational derived wastes) must be managed, controlled and disposed of per the KSC Waste Management requirements outlined in KNPR 8500.1. A Process Waste Questionnaire (PWQ),

TO: Mike Deliz, TA-A4B, 321-867-6971 **DATE:** 5/2/2014

FROM: TA-A4C/Environmental Management Branch

SUBJECT KSC Record of Environmental Consideration (REC) **REC #:** 9294

KSC Form 26-551 along with any supporting documentation (MSDS, product formulation, lab analyses) must be submitted to the IHA Waste Management Office for each waste stream generated. That office will then generate a Technical Response Package (TRP) which will give direction on proper handling, storage, and disposal of the waste stream. Please contact IHA Waste Management Services at 321-867-8640 if assistance is required.

3.a.3. AIR DRYER OR CONDITIONER CONDENSATE (including retrofits): The air conditioner condensate must be discharged to sanitary sewer, or at/above grade, but not below grade. If below grade, this discharge may be considered an Industrial Wastewater/Underground Injection Control (UIC) discharge. This underground discharge includes the use of gravel filled French Drains. A French Drain can be considered a UIC well if the depth of the drain is greater than the width of the drain. To avoid permitting as a UIC well, the discharge point of the condensate drain must be above grade and the drain itself must be wider than it is deep. If the existing French Drain is considered a UIC or the dimensions of the French Drain are not known, the condensate piping must be cut off above grade and the condensate allowed to gravity drain into the drain. There must be an air gap between the piping and the French Drain. Contact Doug Durham (TA-A4B, 321-867-8429) for additional information on this requirement.

NOTE: Approval from ISC must be obtained to discharge condensate and chilled or hot water including DI water to the sanitary sewer. To receive approval, submit a PWQ (as described above in 3.a.2.) for the wastewater stream to IHA Waste Management. Contact Doug Durham (TA-A4B, 321-867-8429) for additional information on this requirement.

3.a.4. THREATENED AND ENDANGERED SPECIES: This project has the potential to impact protected and/or threatened and endangered species; which may include the Florida scrub jay, Eastern indigo snake, gopher tortoises, etc. Measures must be taken to minimize possible impacts to Protected & Threatened species. A biological survey will be required to identify potential impacts prior to ground disturbance. Please contact Becky Bolt (IHA-200, 321-867-7330) 14 days prior to beginning work to schedule a biological survey of the project area. Please arrange to have a project proponent representative present during the survey, and have all proposed areas to be cleared identified with flag/stakes/tape or other clearly evident means. Once identified, marked burrows and any others observed during the project must be avoided. If identified burrows are within the area of construction, relocation of animal in question will be required. Relocation of gopher tortoises requires a Florida Fish and Wildlife Conservation Commission permit. Additional information on gopher tortoise permits can be found at http://myfwc.com/license/wildlife/gopher-tortoise-permits/.

3.a.5. HISTORIC PROPERTY: Launch Complex 39A is listed as a Historic District in the National Register of Historic Places (NRHP) under the context of the Apollo Program and eligible under the Space Shuttle Program (SSP). This air sparging project will not change or diminish the integrity (form and/or function) of the complex; therefore, this is not considered an adverse effect to the historic property. This activity is covered under the Programmatic Agreement (PA) for Management of Historic Facilities (Appendix C, Item 11. Health and Safety). Contact Barbara Naylor (TA-A4C, 321-867-8452) or Nancy English (TA-A4C, 321-867-6987) with any questions.

3.a.6. EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPs): All precautions must be made to eliminate or reduce to the greatest extent possible any discharge of sediments outside established project boundaries. This can be accomplished by initiating a proactive erosion control BMP. Installation and maintenance of appropriate erosion/sediment control devices such as wattles, turbidity screens (silt fences) and/or floating turbidity booms must be completed prior to initial land disturbance where the possibility of sediment discharge could impact surrounding stormwater conveyances and other surface waters. The BMPs must be maintained so they remain functional until such time that the newly exposed soils are stabilized with sod or natural vegetation. Contact Doug Durham (TA-A4C, 321-867-8429) with any

questions on this requirement.

3.a.7. CONCRETE WASHOUT: Water used to rinse out concrete trucks and other equipment used for concrete work must not be allowed to discharge to surface waters. Concrete washout water shall be diverted to a settling pond where suspended material will settle out and the water can percolate into the ground. After drying/settling, the residue may be disposed of as solid waste, recycled, or transported to the DARCY; and the ground restored (if required). Contact Doug Durham (TA-A4C, 321-867-8429) with any questions on this requirement.

3.a.8. GREEN PURCHASING/SUSTAINABLE ACQUISITION: Federal agencies and their contractors are required to purchase products made from recycled or recovered materials and other environmentally preferable products whenever possible. The EPA Environmentally Preferable Purchasing (EPP) website at http://www.epa.gov/epp/ provides information and useful links and tools for finding and evaluating green products. Detailed information on EPA approved products is available at http://www.epa.gov/cpg/products. A Request for Waiver Form (KSC 28-825 NS) must be submitted for the purchase of items that are on the Comprehensive Procurement Guidelines (CPG) list but were replaced with non AP (affirmative procurement) approved items. Also, a list of bio-based preferred products is available at http://www.biopreferred.gov/ProductCategories.aspx. Contact Alice Smith (TA-A4C, 321-867-8454) with any questions on this requirement.

3.b.1. EXCAVATION PERMIT: A KSC Excavation Permit will be required for any digging proposed by this project. Please contact the Utility Locate/Excavation Permit Request Customer Helpline at 321-867-2406 or go to website at https://installationsupport.ksc.nasa.gov/sgs/apps/epr/default.cfm for an underground utility scan and dig permit. **NOTE: KSC excavation permit #16936 has been issued for this project.**

3.b.2. AIR EMISSIONS: NASA currently holds a facility-wide Title V Air Operation Permit for KSC issued by the Florida Department of Environmental Protection (FDEP). This permit covers air emissions from dozens of significant and insignificant sources across KSC to comply with Federal Clean Air Act and State of Florida regulations.

NASA/KSC has Remedial Activities listed on the Title V Air Operating Permit as an insignificant activity. The proposed air sparging groundwater remediation system would be considered insignificant if the Remediation system/unit/activity would not emit or have the potential to emit (PTE):

a. 500 pounds per year or more of lead and lead components expressed as lead;
b. 1,000 pounds per year or more of any hazardous air pollutant;
c. 2,500 pounds per year or more of total hazardous air pollutants; or
d. 5.0 tons per year or more of any other regulated pollutant, Per Rule 62-213.430(6), F.A.C.

If the above criteria cannot be met, a construction permit would then be required. Please contact Christine Vanaman (IHA-200, 321-867-3586) for additional information.

No other environmental issues were identified based upon the information provided in the KSC Environmental Checklist. This Record of Environmental Consideration (REC) does not relinquish the project lead from obtaining and complying with any other internal NASA permits or directives necessary to ensure all organizations potentially impacted by this project are notified and concur with the proposed project.

Avoid Verbal Orders

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FROM: TA-A4C/Environmental Management Branch

SUBJECT KSC Record of Environmental Consideration (REC) **REC #:** 9294

Due to potential changes in regulations, permit requirements and environmental conditions, statements in this REC are valid for 6 months and subject to review after this period. It is the responsibility of the project lead to notify the Environmental Management Branch (TA-A4C) if the scope of the project has changed since the original checklist was submitted.

M. Deliz/TA-A4B
cc:
C. Pike/TetraTech
C. Vanaman/IHA-200
R. Bolt/IHA-200
D. Durham/IHA-200
N. English/TA-A4C
B. Naylor/TA-A4C

4 Upon evaluation of the subject project, the above determinations have been made and identified. Contact the Environmental Management Branch (TA-A4C) at 861-1196 for re-evaluation should there be any modifications to the scope of work.



5/6/2014 9:52:33 AM

Don Dankert **Date**

AVOID VERBAL ORDERS

DATE: 6/02/2014
APPROVAL VALID UNTIL: 6/02/2019

TO: Mike Deliz, KSC-TAC3

TITLE: **Air Sparge system installation at LC39A**

SITE PLAN: 14-0050 (J08-E1571305)

SUBJECT: **Site Plan Approval**

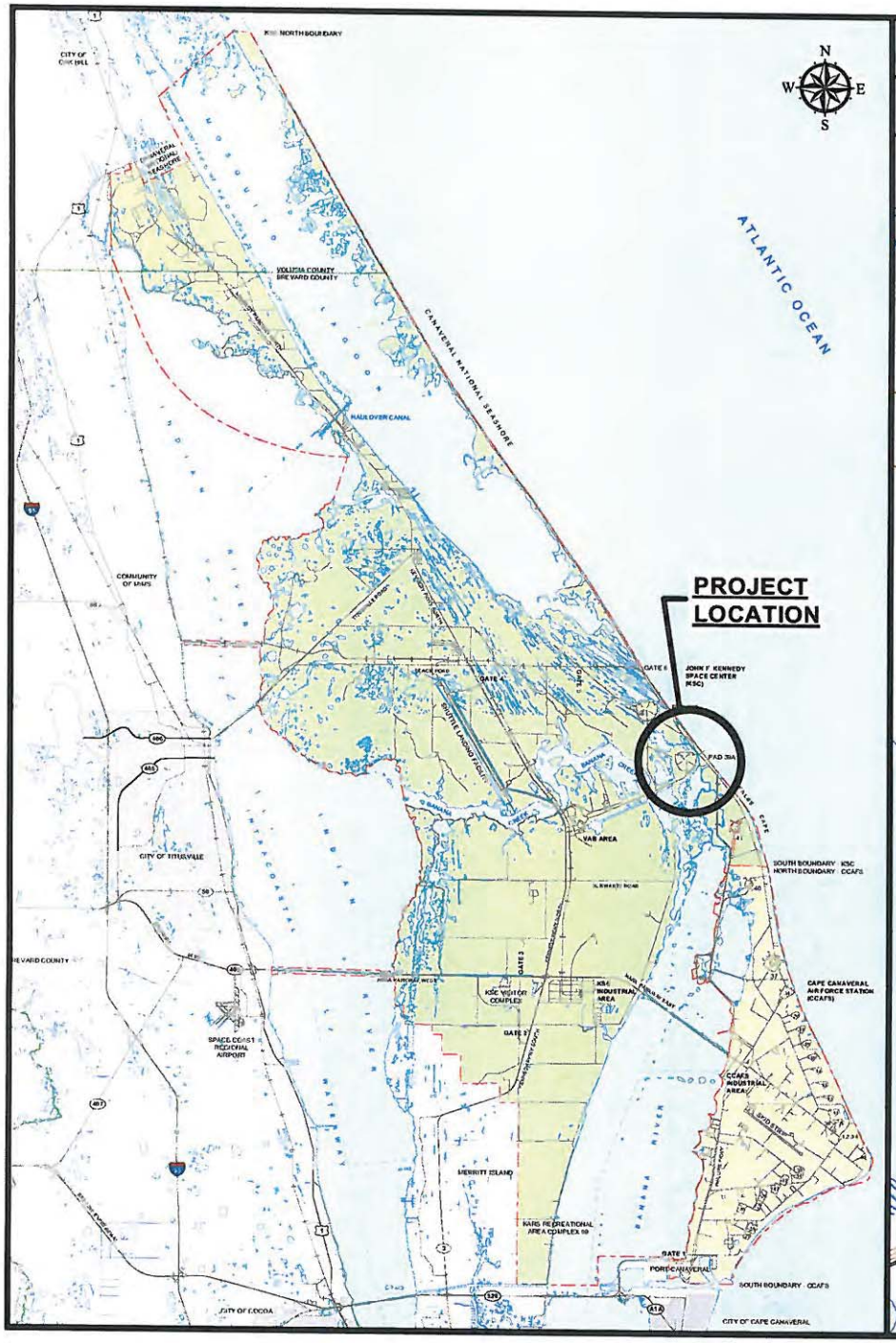
This letter indicates that the proposed site plan has met with the approval of the Master Planning Office. As an approved site plan, it will remain valid for a period of five (5) years. If the project has not been initiated within this five-year period, this approval will be rescinded and you must re-submit your plan for review.

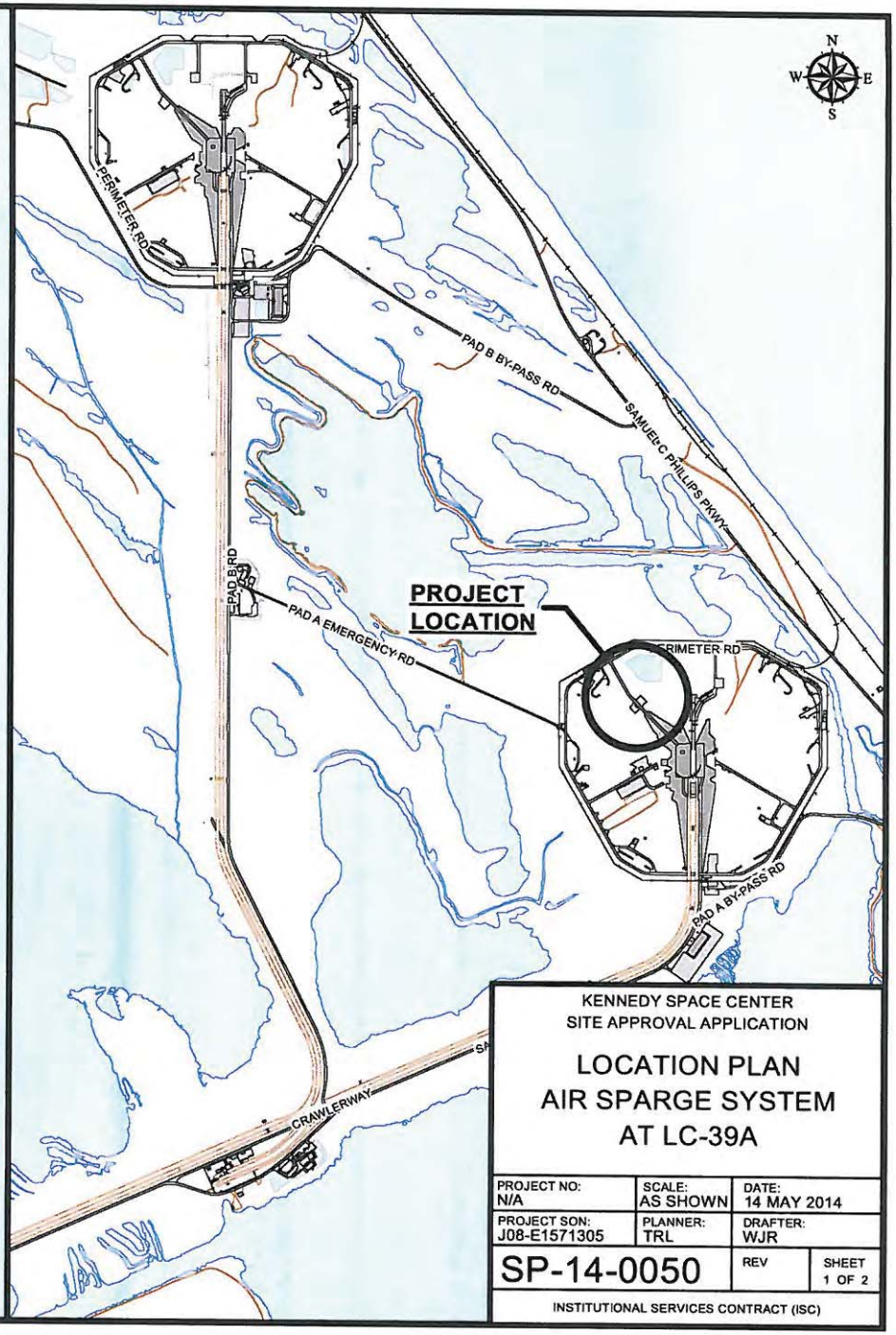
Within this approval package, you will find a copy of the comment log, site plan, and maps. The comment log contains comments and concerns regarding this site plan. Please note that your final plan must comply with all conditions and restrictions contained within the approval package.

This letter signifies approval by the Master Planning Office **only** and does not entitle you to funds or facilities that may be necessary to fulfill this project. It is your responsibility to attain the necessary funds or materials, as well as a Utility Locate/Excavation Permit to complete this project.

FROM: Leroy C. Smith
Leroy Smith

ORGANIZATION: TA-B4C **EXT**: 7-8499



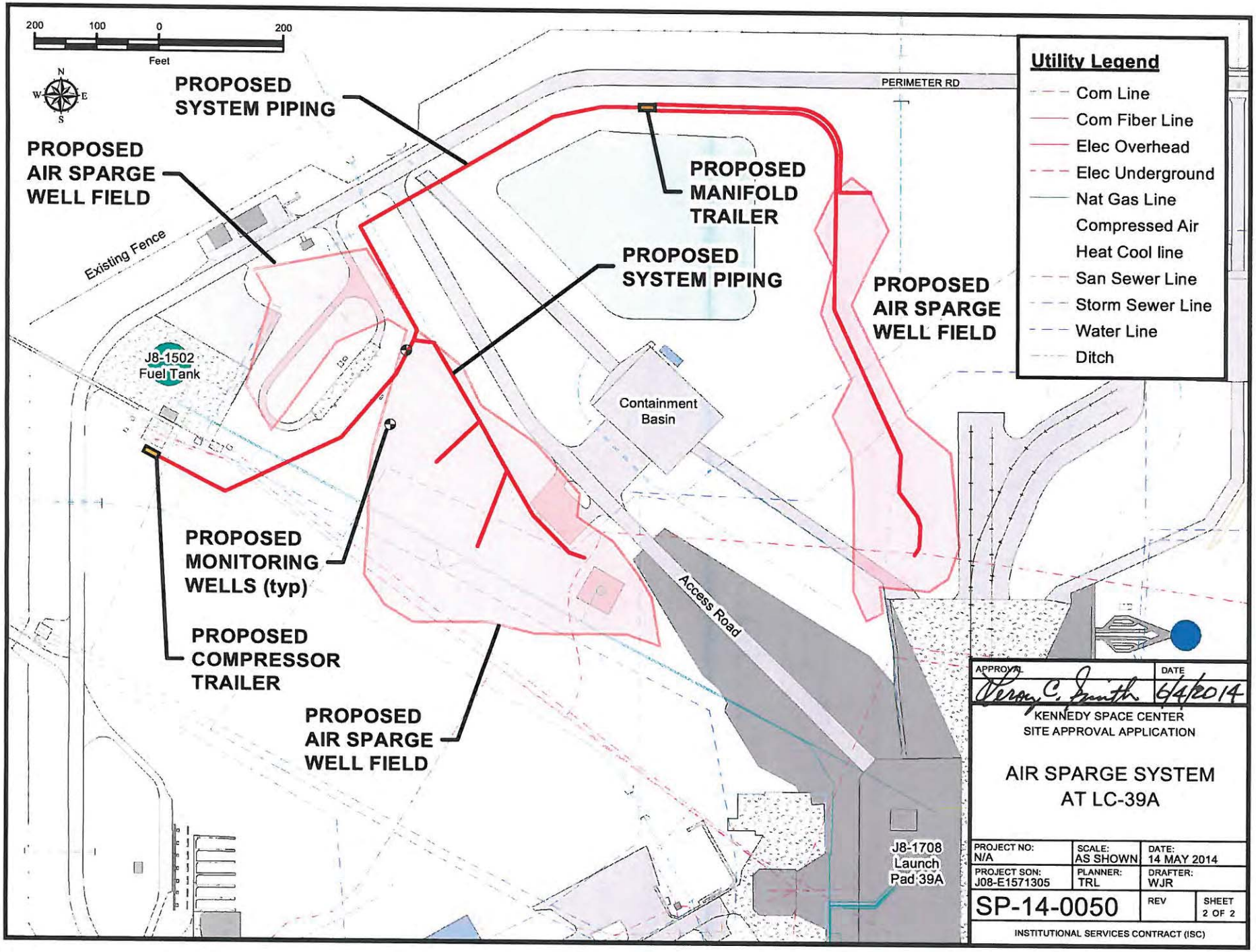


KENNEDY SPACE CENTER
SITE APPROVAL APPLICATION

LOCATION PLAN
AIR SPARGE SYSTEM
AT LC-39A

PROJECT NO: N/A	SCALE: AS SHOWN	DATE: 14 MAY 2014
PROJECT SON: J08-E1571305	PLANNER: TRL	DRAFTER: WJR
SP-14-0050	REV	SHEET 1 OF 2

INSTITUTIONAL SERVICES CONTRACT (ISC)


200 100 0 200
Feet
N
W E
S
PROPOSED SYSTEM PIPING
PROPOSED AIR SPARGE WELL FIELD
PERIMETER RD
PROPOSED MANIFOLD TRAILER
PROPOSED SYSTEM PIPING
PROPOSED AIR SPARGE WELL FIELD
Existing Fence
J8-1502 Fuel Tank
Containment Basin
Access Road
PROPOSED MONITORING WELLS (typ)
PROPOSED COMPRESSOR TRAILER
PROPOSED AIR SPARGE WELL FIELD
J8-1708 Launch Pad 39A
Utility Legend
Com Line
Com Fiber Line
Elec Overhead
Elec Underground
Nat Gas Line
Compressed Air
Heat Cool line
San Sewer Line
Storm Sewer Line
Water Line
Ditch
APPROVAL
DATE
6/4/2014
KENNEDY SPACE CENTER
SITE APPROVAL APPLICATION
AIR SPARGE SYSTEM
AT LC-39A
PROJECT NO: N/A
SCALE: AS SHOWN
DATE: 14 MAY 2014
PROJECT SON: J08-E1571305
PLANNER: TRL
DRAFTER: WJR
SP-14-0050
REV
SHEET 2 OF 2
INSTITUTIONAL SERVICES CONTRACT (ISC)

REQUEST FOR SITE PLAN REVIEW

J8 - E1571305 - 16936	**14-0050**	**Date Released:**	**Return Due Date:**
Grid - WON - EPR	**(Site Plan #)**	5/27/2014	5/30/2014

TO:

1	Mike Deliz	2	Keith Britton	3	Donald Brown	4	Stephen "Bo" Brown
5	David Burris	6	Edmund Byczek	7	Trey Carlson	8	Sheryl Chaffee
9	Ralph Crawford	10	John Creech	11	James Curtis	12	Doug Czerwinski
13	John Davies	14	Michael Davis	15	Mike Denyer	16	Frank Der
17	Kyle Dixon	18	Jeffry Dudley	19	George Dutt	20	Nancy English
21	Ellen Feeney	22	Derick Fowler	23	Lisa Fowler	24	Justin Gilman
25	Steve Gilmore	26	James Hall	27	Lauren Harley	28	Shawn Harris
29	Stacey Hopper (info onl	30	Tim Leech	31	Mike Legare	32	Alan Leite
33	Eric Levison	34	Laura Lopetz	35	MESC Environmental	36	James Miller
37	Michael Mills	38	Center Operations NA	39	Institutional Safety NAS	40	Barbara Naylor
41	Tamara Pope	42	Merissa Rudkin	43	Steven Schindler	44	William "Bill" Simmond
45	Joe Torsani	46	Ron Traylor	47	Gene Walker	48	Glenn Walters
49	Kurt Warner	50	Joel Waters	51	Christopher "Glen" Willi		

REQUEST FOR SITE PLAN REVIEW

		Date Released:	Return Due Date:
J8 - E1571305 - 16936	14-0050	5/27/2014	5/30/2014
Grid -WON-EPR	(Site Plan #)		

Return Completed Form To:

ISC Master Planning, ISC-4026, Fax 867-1175, Phone 867-8187

Subject, Title or Project #:

Air sparge system installation at LC39A

Please send correspondence ATTN: **Thomas Lombardo**
Company:
Functions:
Responsibility/Role:
Phone: 867-7590 FAX:

Return Completed Form To:	**For Information Contact:**
ISC Master Planning, ISC-4026, Fax 867-1175, Phone 867-8187	Deliz, Mike 867-6971 Deliz, Mike 867-6971
Subject, Title or Project #:	**Released By:**
Air sparge system installation at LC39A	Lombardo, Thomas 867-7590 **ISC Master Planning**

Summary or Brief Description of Project:

This is a siting request for the installation of groundwater treatment air sparge system and soil interim measure within Pad A. The air sparge well location and associated trenching and proposed manifold boxes and trailer locations are shown on Figure 2 within the attachment. The areas requiring soil excavation are shown on Figure 3.
The sparge wells will be installed to approxmately 35 beet below land surface and the excavations range from 6" to 3 feet.

Justification:

Site plan is required before installing air sparge wells and trenching and the excavations.The cleanup is being installed as part of KSC's Resource Conservation and Recovery Act Permit.

Site Location: J8-1708 **Use Designation:**

Finding of Consistancy with General Plan: Yes **ProjectType:** Well **Project #:**

Capitalization required; forward closeout documents to Real Property office.

User: **Cost:** **Fund:** **FY:**

Should the contractor observe any soil anomaly, an IRP Rep. is to be contacted (867-8448).

You are requested to review the subject Site Plan and return your response within 7 days. All review comments should be submitted on this sheet and returned to the ISC Master Planning Office. You do not need to return the other sheets. Indicate your response in the Review Action column below by entering an "X" in the appropriate space. Your concurrence signature indicates you have reviewed the Site Plan with respect to your functional responsibility and concur with the proposed location. This does not constitute either project or design approval.

Please ensure that the KSC tie-down standard is applied to your project for all trailers, sheds (gazebos, POLs,) and/or other equipment. The tie-down standard is: Anchor and Tie-down installation standards for Mobile/manufactured homes and park trailers. Florida Administrative Code (FAC) Volume 7, Title 15, Chapter 15C-1, Sections 1.010 through 1.0110 (Department of Highway Safety and Motor Vehicles.)

Signature and Printed Name	Office/Functional Responsibility and PHONE	**Date**	**Concur No Comments**	**Concur Subject to Comments**	**Non-concur (See Comments)**

Comments (Continue on Separate Sheet if Necessary):

REQUEST FOR SITE PLAN REVIEW

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Grid -WON-EPR	(Site Plan #)		

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Air sparge system installation at LC39A

Please send correspondence ATTN: **Thomas Lombardo**
Company:
Functions:
Responsibility/Role:
Phone: 867-7590 FAX:

SITE PLAN REVIEW -- EMAIL LIST*

NO.	MAIL	NAME	PHONE	FAX	E-MAIL
1	TA-C3	Mike Deliz	867-6971	867-8040	DelizMJ@kscems.ksc.nasa.gov
2	TA-B3C	Keith Britton	867-1955	867-5694	Keith.J.Britton@nasa.gov
3	IMCS-506	Donald Brown	867-3550	867-3756	donald.l.brown@nasa.gov
4	SA-G	Stephen "Bo" Brown	867-6959	867-2035	Stephen.D.Brown@nasa.gov
5	TA-E4	David Burris	867-3053	8678-8495	david.w.burris@nasa.gov
6	ISC-2120	Edmund Byczek	861-4683	861-0782	Edmund.J.Byczek@nasa.gov
7	AD	Trey Carlson	867-5451	867-4015	Trey.carlson-1@nasa.gov
8	TA-B4C	Sheryl Chaffee	867-8047	861-7946	sheryl.l.chaffee@nasa.gov
9		Ralph Crawford	321.494.9718		Ralph.crawford.ctr@us.af.mil
10	TAB4B	John Creech	867-4395	867-1425	john.n.creech@nasa.gov
11	CS3-4300	James Curtis	861-0765	867-4785	james.j.curtis@nasa.gov
12	ISC-2300	Doug Czerwinski	867-4541	867-1339	douglas.a.czerwinski@nasa.gov
13	TA-B3B	John Davies	867-1925	867-5694	john.p.davies@nasa.gov
14	GG-P	Michael Davis	321-867-7487	321-867-4969	michael.c.davis@nasa.gov
15	ISC-2200	Mike Denyer	867-1289	867-1497	Michael.L.Denyer@nasa.gov
16	TA-B3A	Frank Der	867-3476	867-2496	frank.der@nasa.gov
17	NE	Kyle Dixon	861-6956	867-1425	kyle.l.dixon@nasa.gov
18	TA-A2	Jeffry Dudley	321-867-5530	321-867-8102	jeffry.t.dudley@nasa.gov
19	IT-D	George Dutt	867-3156	867-3756	george.l.dutt@nasa.gov

REQUEST FOR SITE PLAN REVIEW

J8 - E1571305 - 16936	**14-0050**	**Date Released:**	**Return Due Date:**
Grid -WON-EPR	**(Site Plan #)**	5/27/2014	5/30/2014

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Phone: 867-7590 FAX:

20	TA-A2	Nancy English	867-6987	867-7206	Nancy.S.English@nasa.gov
21	ISC-2200	Ellen Feeney	867-1542	867-1339	ellen.s.feeney@nasa.gov
22	ISC-2223	Derick Fowler	861-6297	861-6114	derick.c.fowler@nasa.gov
23	KSC-PA000	Lisa Fowler	321-867-1883		lisa.a.fowler@nasa.gov
24	ISC-4027	Justin Gilman	867-5839	867-1175	justin.b.gilman@nasa.gov
25	AA-D	Steve Gilmore	321-867-8207		steven.gilmore@nasa.gov
26	ISC-2200	James Hall	867-1089	867-8676	james.e.hall@nasa.gov
27	AF	Lauren Harley	494-8399	494-9707	lauren.Harley.ctr@us.af.mil
28	CCNS	Shawn Harris	321-267-1110		shawn.harris@nps.gov
29	ISC-4026	Stacey Hopper (info only)	867-8187	867-1175	stacey.l.hopper@nasa.gov
30	45 CES/CENPL	Tim Leech	853-0963/ 494-9246	853-6255	Timothy.Leech@us.af.mil
31	USFWS	Mike Legare	861-2369	861-8913	Mike_Legare@fws.gov
32	NE-E1	Alan Leite	861-0766	867-9424	alan.s.leite@nasa.gov
33	CS3-322	Eric Levison	867-2126	861-0798	eric.s.levison@nasa.gov
34	ISC-4027	Laura Lopetz	867-0851	867-1175	laura.a.lopetz@nasa.gov
35		MESC Environmental	867-8430		ksc-mesc-env@mail.nasa.gov
36	TA-B3B	James Miller	867-5694	867-3743	james.d.miller@nasa.gov
37	CS3-4300	Michael Mills	861-8931		michael.g.mills@nasa.gov
38	TA-B4	Center Operations NASA			KSC-NASA-Master-Plan@mail.nasa.gov
39	SA-E2	Institutional Safety NASA			KSC-NASA-Institutional-Safety-Branch@mail.nasa.gov

REQUEST FOR SITE PLAN REVIEW

		Date Released:	Return Due Date:
J8 - E1571305 - 16936	14-0050	5/27/2014	5/30/2014
Grid -WON-EPR	(Site Plan #)		

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Air sparge system installation at LC39A

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Company:
Functions:
Responsibility/Role:
Phone: 867-7590 FAX:

40	TA-A4C	Barbara Naylor	867-8452	867-4446	barbara.a.naylor@nasa.gov
41	GP-G1	Tamara Pope	867-5858	867-7282	tamara.j.pope@nasa.gov
42	CSR 3410	Merissa Rudkin	853-2639		merissa.rudkin.ctr@us.af.mil
43	IT-D1	Steven Schindler	867-2520	867-8039	steven.f.schindler@nasa.gov
44	VA-E2-C	William "Bill" Simmonds	853-9301		William.b.simmonds@nasa.gov
45	TAA50	Joe Torsani	321-861-3806		joseph.a.torsani@nasa.gov
46	ISC-8200	Ron Traylor	867-3300	867-7737	KSC-ISC-EnvironmentalShared@mail.nasa.gov
47	GG-B	Gene Walker	867-2714	867-2704	eugene.e.walker@nasa.gov
48	ISC-4022	Glenn Walters	867-0847		glenn.a.walters@nasa.gov
49	CSR-4520	Kurt Warner	853-6086	853-3839	kurt.warner.ctr@us.af.mil
50	YANG-174	Joel Waters	749-4951	867-9636	Joel.Waters-1@ksc.nasa.gov
51	SCJ-100	Christopher "Glen" Willis	867-6290	867-8469	Christopher.G.willis@nasa.gov

**Footnote: Reviewers will be listed on the "FAX LIST" or "EMAIL LIST" but not on both. Most reviewers will display on the "FAX LIST". Reviewers will displayed on the "EMAIL LIST" ONLY if one of the following conditions are true: 1) ONLY have the Email preference selected OR 2) don't have any preference selected.*

SITE PLAN COMMENT LOG

WON# E1571305 **Project Title:** Air sparge system installation at LC39A

Map: J8

Date Completed: **Site Plan #:** 14-0050 **Rev:**

Planner: Lombardo, Thomas 867-7590 **EPR #:** 16936

#	COMMENTS RECEIVED DATE	CONTACT / ORG. / PHONE	SITE PLAN COMMENTS / ISC ACTIONS & RECOMMENDATIONS
1		Mike Deliz TA-C3 Company: NASA Functions: Responsibility/Role: Phone: 867-6971 FAX: 867-8040 Email: DelizMJ@kscems.ksc.nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
2		Keith Britton TA-B3C Company: NASA/ODIN Functions: Responsibility/Role: TA-B3C Phone: 867-1955 FAX: 867-5694 Email: Keith.J.Britton@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
3		Donald Brown IMCS-506 Company: ABACUS Functions: Communications Responsibility/Role: Comm - Security/Facilities Phone: 867-3550 FAX: 867-3756 Email: donald.l.brown@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
4	5/27/2014	Stephen "Bo" Brown SA-G Company: NASA Functions: Emitters/Frequency Analysis,Safety - Explosives, Toxic Modeling, Ground Responsibility/Role: Explosive Safety Phone: 867-6959 FAX: 867-2035	Reviewer Comments: Concur
5		David Burris TA-E4 Company: NASA Functions: Responsibility/Role: Engineer Phone: 867-3053 FAX: 8678-8495 Email: david.w.burris@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
6		Edmund Byczek ISC-2120 Company: URS Functions: Fire/Protective Systems Responsibility/Role: Protective Systems Phone: 861-4683 FAX: 861-0782 Email: Edmund.J.Byczek@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
7		Trey Carlson AD Company: NASA Functions: Responsibility/Role: KSC Center Planning & Development Phone: 867-5451 FAX: 867-4015 Email: Trey.carlson-1@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.

SITE PLAN COMMENT LOG

WON# E1571305 **Project Title:** Air sparge system installation at LC39A

Map: J8

Date Completed: **Site Plan #:** 14-0050 **Rev:**

Planner: Lombardo, Thomas 867-7590 **EPR #:** 16936

#	COMMENTS RECEIVED DATE	CONTACT / ORG. / PHONE	SITE PLAN COMMENTS / ISC ACTIONS & RECOMMENDATIONS
8		Sheryl Chaffee TA-B4C Company: NASA KSC Functions: Responsibility/Role: Real Property Phone: 867-8047 FAX: 861-7946 Email: sheryl.l.chaffee@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
9		Ralph Crawford Company: CSR Functions: Line of Sight (LOS),Weather Responsibility/Role: Line of Sight Impact Analysis Phone: 321.494.9718 FAX: Email: Ralph.crawford.ctr@us.af.mil	Reviewer Comments: Info Only - no response required
10	5/15/2014	John Creech TAB4B Company: NASA Functions: Responsibility/Role: Phone: 867-4395 FAX: 867-1425 Email: john.n.creech@nasa.gov	Reviewer Comments: Concur
11		James Curtis CS3-4300 Company: Chenega S3 Functions: Responsibility/Role: Lock Shop Supervisor Phone: 861-0765 FAX: 867-4785 Email: james.j.curtis@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
12		Doug Czerwinski ISC-2300 Company: URS Functions: Responsibility/Role: O&M Fire & Roads Phone: 867-4541 FAX: 867-1339 Email: douglas.a.czerwinski@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
13		John Davies TA-B3B Company: NASA Functions: Responsibility/Role: Facilities: Mechanical Phone: 867-1925 FAX: 867-5694 Email: john.p.davies@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
14		Michael Davis GG-P Company: NASA Functions: Responsibility/Role: Phone: 321-867-7487 FAX: 321-867-4969 Email: michael.c.davis@nasa.gov	Reviewer Comments: Info Only - no response required

SITE PLAN COMMENT LOG

WON# E1571305 **Project Title:** Air sparge system installation at LC39A

Map: J8

Date Completed: **Site Plan #:** 14-0050 **Rev:**

Planner: Lombardo, Thomas 867-7590 **EPR #:** 16936

#	COMMENTS RECEIVED DATE	CONTACT / ORG. / PHONE	SITE PLAN COMMENTS / ISC ACTIONS & RECOMMENDATIONS
15		Mike Denyer ISC-2200 Company: URS Functions: Responsibility/Role: HVAC SME O&M Phone: 867-1289 FAX: 867-1497 Email: Michael.L.Denyer@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
16	5/16/2014	Frank Der TA-B3A Company: NASA Functions: Eng - Civil/Structural Responsibility/Role: Civil/Structural Engineering Phone: 867-3476 FAX: 867-2496 Email: frank.der@nasa.gov	Reviewer Comments: Concur
17	5/15/2014	Kyle Dixon NE Company: NASA Functions: Responsibility/Role: Phone: 861-6956 FAX: 867-1425 Email: kyle.l.dixon@nasa.gov	Reviewer Comments: Concur
18		Jeffry Dudley TA-A2 Company: NASA Functions: Responsibility/Role: Fire Protection Phone: 321-867-5530 FAX: 321-867-8102 Email: jeffry.t.dudley@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
19		George Dutt IT-D Company: NASA Functions: Communications Responsibility/Role: Communications Services Phone: 867-3156 FAX: 867-3756 Email: george.l.dutt@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
20		Nancy English TA-A2 Company: Functions: Responsibility/Role: KSC Historic Preservation Phone: 867-6987 FAX: 867-7206 Email: Nancy.S.English@nasa.gov	Reviewer Comments: Info Only - no response required
21	5/15/2014	Ellen Feeney ISC-2200 Company: URS Functions: Water, Waste Water Responsibility/Role: Water/Wastewater/Plumbing Phone: 867-1542 FAX: 867-1339 Email: ellen.s.feeney@nasa.gov	Reviewer Comments: Concur

SITE PLAN COMMENT LOG

WON# E1571305 **Project Title:** Air sparge system installation at LC39A

Map: J8

Date Completed: **Site Plan #:** 14-0050 **Rev:**

Planner: Lombardo, Thomas 867-7590 **EPR #:** 16936

#	COMMENTS RECEIVED DATE	CONTACT / ORG. / PHONE	SITE PLAN COMMENTS / ISC ACTIONS & RECOMMENDATIONS
22		Derick Fowler ISC-2223 Company: Yang Enterprises Functions: Roads and Grounds Responsibility/Role: Road Maintenance Phone: 861-6297 FAX: 861-6114 Email: derick.c.fowler@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
23	5/15/2014	Lisa Fowler KSC-PA000 Company: Functions: Responsibility/Role: Public Affairs Phone: 321-867-1883 FAX: Email: lisa.a.fowler@nasa.gov	Reviewer Comments: Concur
24		Justin Gilman ISC-4027 Company: DYNAMAC CORP Functions: Responsibility/Role: Energy Phone: 867-5839 FAX: 867-1175 Email: justin.b.gilman@nasa.gov	Reviewer Comments: Info Only - no response required
25		Steve Gilmore AA-D Company: Functions: Responsibility/Role: KSC Planning and Development Phone: 321-867-8207 FAX: Email: steven.gilmore@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
26		James Hall ISC-2200 Company: URS Functions: Water, Waste Water,HVAC Responsibility/Role: HVAC & Water/Wastewater Phone: 867-1089 FAX: 867-8676 Email: james.e.hall@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
27		Lauren Harley AF Company: Air Force Functions: Responsibility/Role: Phone: 494-8399 FAX: 494-9707 Email: lauren.Harley.ctr@us.af.mil	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
28		Shawn Harris CCNS Company: NPS Functions: Responsibility/Role: Phone: 321-267-1110 FAX: Email: shawn.harris@nps.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.

SITE PLAN COMMENT LOG

WON# E1571305 **Project Title:** Air sparge system installation at LC39A

Map: J8

Date Completed: **Site Plan #:** 14-0050 **Rev:**

Planner: Lombardo, Thomas 867-7590 **EPR #:** 16936

#	COMMENTS RECEIVED DATE	CONTACT / ORG. / PHONE	SITE PLAN COMMENTS / ISC ACTIONS & RECOMMENDATIONS
29		Stacey Hopper (info only) ISC-4026 Company: URS Functions: Airfield,Airfield Waiver,Impact Limit Lines Responsibility/Role: Master Planning/Space Allocation Phone: 867-8187 FAX: 867-1175	Reviewer Comments: Info Only - no response required
30		Tim Leech 45 CES/CENPL Company: AF 45SW Functions: Airfield,Airfield Waiver,Planning Responsibility/Role: CCAFS Community Planner Phone: 853-0963/ 494-9246 FAX: 853-	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
31	5/19/2014	Mike Legare USFWS Company: FWS Functions: Responsibility/Role: Phone: 861-2369 FAX: 861-8913 Email: Mike_Legare@fws.gov	Reviewer Comments: Concur
32		Alan Leite NE-E1 Company: NASA Functions: Responsibility/Role: Electromagnetic Lab Phone: 861-0766 FAX: 867-9424 Email: alan.s.leite@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
33	5/16/2014	Eric Levison CS3-322 Company: G4S Functions: Fire/Protective Systems Responsibility/Role: Fire Services Phone: 867-2126 FAX: 861-0798 Email: eric.s.levison@nasa.gov	Reviewer Comments: Concur
34	5/16/2014	Laura Lopetz ISC-4027 Company: URS Functions: Responsibility/Role: Real Property Phone: 867-0851 FAX: 867-1175 Email: laura.a.lopetz@nasa.gov	Reviewer Comments: Concur
35	5/16/2014	MESC Environmental Company: IHA Functions: Environmental Responsibility/Role: KSC Environmental Phone: 867-8430 FAX: Email: ksc-mesc-env@mail.nasa.gov	Reviewer Comments: Concur

SITE PLAN COMMENT LOG

WON# E1571305 **Project Title:** Air sparge system installation at LC39A

Map: J8

Date Completed: **Site Plan #:** 14-0050 **Rev:**

Planner: Lombardo, Thomas 867-7590 **EPR #:** 16936

#	COMMENTS RECEIVED DATE	CONTACT / ORG. / PHONE	SITE PLAN COMMENTS / ISC ACTIONS & RECOMMENDATIONS
36	5/16/2014	James Miller TA-B3B Company: NASA Functions: Responsibility/Role: KSC Engineering-Electrical Phone: 867-5694 FAX: 867-3743 Email: james.d.miller@nasa.gov	Reviewer Comments: Concur
37	5/20/2014	Michael Mills CS3-4300 Company: Chenega Security and Support Solutions Functions: Responsibility/Role: Security Phone: 861-8931 FAX: Email: michael.g.mills@nasa.gov	Reviewer Comments: Concur
38		Center Operations NASA TA-B4 Company: NASA Functions: Responsibility/Role: Master Planning, Space Allocation, Real Property Phone: FAX: Email: KSC-NASA-Master-	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
39		Institutional Safety NASA SA-E2 Company: NASA Functions: Safety - Explosives, Toxic Modeling, Ground Responsibility/Role: Institutional Safety Phone: FAX: Email: KSC-NASA-Institutional-Safety-	Reviewer Comments: Cocnur with comment This review was for the proposed location for Institutional Safety purposes only, and was not reviewed for health, fire, environmental, emergency preparedness, or security, as these disciplines are the responsibility of the TA/Center Operations directorate. Nor was the review done to identify and rectify hazards that may occur during operations/construction/installation/demolition. ISC Actions: Master Planning acknowledges Mr. Facemires comments ISC Recommendation: Approve
40	5/21/2014	Barbara Naylor TA-A4C Company: NASA Functions: Archaeology/Historic Preservation Responsibility/Role: KSC Historic Preservation Officer Phone: 867-8452 FAX: 867-4446	Reviewer Comments: Concur with comments Historic Area (#118 - Canaveral Club) is shown within the Launch Complex 39A in the "Historic Context and Historic Period Archaeological Site Location Predictive Model Report," revised May 2009, therefore, if any archaeological material (e.g., artifacts and/or cultural features or human remains) is found during any ground disturbing activities, work must stop immediate and contact the KSC Historic Preservation Officer at 321-867-8452. Materials and remains will need to be identified per NAGPRA (Native American Graves Protection and Repatriation Act). ISC Actions: Comments forwarded to requester ISC Recommendation: Approve

SITE PLAN COMMENT LOG

WON# E1571305 **Project Title:** Air sparge system installation at LC39A

Map: J8

Date Completed: **Site Plan #:** 14-0050 **Rev:**

Planner: Lombardo, Thomas 867-7590 **EPR #:** 16936

#	COMMENTS RECEIVED DATE	CONTACT / ORG. / PHONE	SITE PLAN COMMENTS / ISC ACTIONS & RECOMMENDATIONS
41	5/16/2014	Tamara Pope GP-G1 Company: NASA Functions: Responsibility/Role: Phone: 867-5858 FAX: 867-7282 Email: tamara.j.pope@nasa.gov	Reviewer Comments: Concur
42		Merissa Rudkin CSR 3410 Company: AF Functions: Responsibility/Role: Instrumentation Systems Analysis Phone: 853-2639 FAX: Email: merissa.rudkin.ctr@us.af.mil	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
43		Steven Schindler IT-D1 Company: NASA Functions: Emitters/Frequency Analysis Responsibility/Role: RF (Radio & Radar) Emitters, RF inside buildings. Phone: 867-2520 FAX: 867-8039 Email: steven.f.schindler@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
44		William "Bill" Simmonds VA-E2-C Company: NASA Functions: Responsibility/Role: Phone: 853-9301 FAX: Email: William.b.simmonds@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
45	5/16/2014	Joe Torsani TAA50 Company: NASA Functions: Responsibility/Role: NASA Aviation Safety Officer/Interim Chief of Flight Operations Phone: 321-861-3806 FAX:	Reviewer Comments: Concur
46		Ron Traylor ISC-8200 Company: URS Functions: Responsibility/Role: Environmental Phone: 867-3300 FAX: 867-7737 Email: KSC-ISC-EnvironmentalShared@mail.nasa.gov	Reviewer Comments: Info Only - no response required
47		Gene Walker GG-B Company: NASA Functions: Responsibility/Role: Phone: 867-2714 FAX: 867-2704 Email: eugene.e.walker@nasa.gov	Reviewer Comments: Info Only - no response required

SITE PLAN COMMENT LOG

WON# E1571305 **Project Title:** Air sparge system installation at LC39A

Map: J8

Date Completed: **Site Plan #:** 14-0050 **Rev:**

Planner: Lombardo, Thomas 867-7590 **EPR #:** 16936

#	COMMENTS RECEIVED DATE	CONTACT / ORG. / PHONE	SITE PLAN COMMENTS / ISC ACTIONS & RECOMMENDATIONS
48		Glenn Walters ISC-4022 Company: Dynamac Functions: Responsibility/Role: ISC Site Planning Supervisor Phone: 867-0847 FAX: Email: glenn.a.walters@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
49	5/15/2014	Kurt Warner CSR-4520 Company: CSR Functions: Weather Responsibility/Role: Operations & Maintenance Phone: 853-6086 FAX: 853-3839 Email: kurt.warner.ctr@us.af.mil	Reviewer Comments: Concur
50		Joel Waters YANG-174 Company: Functions: Responsibility/Role: Phone: 749-4951 FAX: 867-9636 Email: Joel.Waters-1@ksc.nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.
51		Christopher "Glen" Willis SCJ-100 Company: SC Jones Functions: Roads and Grounds Responsibility/Role: KSC Grounds Manager Phone: 867-6290 FAX: 867-8469 Email: Christopher.G.willis@nasa.gov	Reviewer Comments: No response received. As stated in the review requests, concurrence without comment is assumed.

UTILITY LOCATE/EXCAVATION PERMIT REQUEST

1. Date	2. Master Planning Site Plan No.	3. Project (PCN) No.	4. Work Order No.	5. Check One
04/24/14				☑ Permit to Dig ☐ Locate Only/ No Digging

6. Requester's Name **(REQUIRED)**	7. Email **(REQUIRED)**	8. Phone No. **(REQUIRED)**	9. Fax No. **(REQUIRED)**
Chris Pike	chris.pike@tetratech.com	412-921-8861	412-921-4040

10. Requester's Company **(REQUIRED)**	11. Mail Code/Address
Tetra Tech	661 Andersen Drive, Foster Plaza 7, Pittsburgh, PA 15220-2745

12. Technical Contact **(REQUIRED)**	13. Email **(REQUIRED)**	14. Phone No. **(REQUIRED)**	15. Fax No. **(REQUIRED)**
Mike Deliz, TA-A4B	michael.j.deliz@nasa.gov	(321) 867-6971	(321) 867-4446

16. KSC NASA Contact Name **(REQUIRED)**	17. Email **(REQUIRED)**	18. Phone No. **(REQUIRED)**
David Diaz	david.diaz-1@nasa.gov	(321) 861-7816

19. Building No. **(REQUIRED)**	20. Grid No. **(REQUIRED)**	21. Secondary Location (Bldg. No./Add. Info.) **(REQUIRED)**
J8-2008	J8	

22. Estimated Start Date **(REQUIRED)**	23. Estimated End Date **(REQUIRED)**
05/05/14	05/05/15

24. Emergency request justification ***(if required)***

25. Reason for permit/Statement of work **(REQUIRED)**

The area is designated Launch Complex 39A Pad A (SWMU008), as shown on attached map (Figure 1). Previous environmental investigations were conducted under Excavation Permits 7606 and 8152, both of which have expired. Installation of an air sparge system and a network of air sparge and monitoring wells, and soil excavations are required. This will involve trenching, infrastructure installation (compressed air piping and electrical), and drilling. Soil excavations and trenching will be conducted to a maximum depth of 3-feet below land surface (bls), and drilling will be completed to a maximum depth of 60 feet bls. Trenching layout and well drilling location areas are shown on Figures 2 and 3. All trenches will be completed with tracer wire installed for future utility location. Soil excavation areas are shown on Figure 4.

MAP/SKETCH, WITH AREA TO BE LOCATED/EXCAVATED CLEARLY MARKED, IS ATTACHED (REQUIRED)

See next page for completion and process instructions.

INSTRUCTIONS

Please complete as many fields as possible.

NOTE: ALL FIELDS INDICATING "(REQUIRED)" MUST PROVIDE INFORMATION.

Block 1 Date submitted.

Block 2-4 Provide related Site Plan, PCN or Work Order Numbers.

Block 5 Check one. If you are NOT going to dig, but need an underground utility locate, check "Locate Only".

Block 6-18 Enter the name, email address, phone, fax number, company name, and address of the person who will be receiving this permit including KSC NASA Contact for Project.

Block 19-20 Enter the building number where work will be performed (or closest building number).

Block 21 Enter additional information as necessary.

Block 22 Enter the date excavation is expected to begin.

Block 23 Enter the date excavation is expected to be complete. Permit will be closed on this date. End date may not be longer than one year from the start date.

Block 24 If excavation is of an emergency nature and requires priority, enter justification.

Block 25 Enter a description of why this permit is being requested, i.e., what work will be performed and why.

REQUIRED: ATTACH A MAP/SKETCH WITH AREA TO BE LOCATED/EXCAVATED CLEARLY MARKED.

1. Email, fax or hand-carry this request, along with a map, drawing or sketch to the Excavation Permit Request (EPR) Administrator using the contact information below.

2. You may contact the EPR Administrator using the contact information below if you have any questions on the dig permit process.

3. To schedule an appointment with the Excavation Permit Inspectors to locate underground utilities and/or obtain an approval signature on this permit to dig, Requester should phone the Excavation Permit Inspectors' Office (321-476-4494/3799) at least 72 hours prior to digging.

4. Requester should notify the EPR Administrator when excavation is complete.

5. Permits may be extended for up to one year by calling the EPR Administrator, but all permits will be closed upon expiration unless notified.

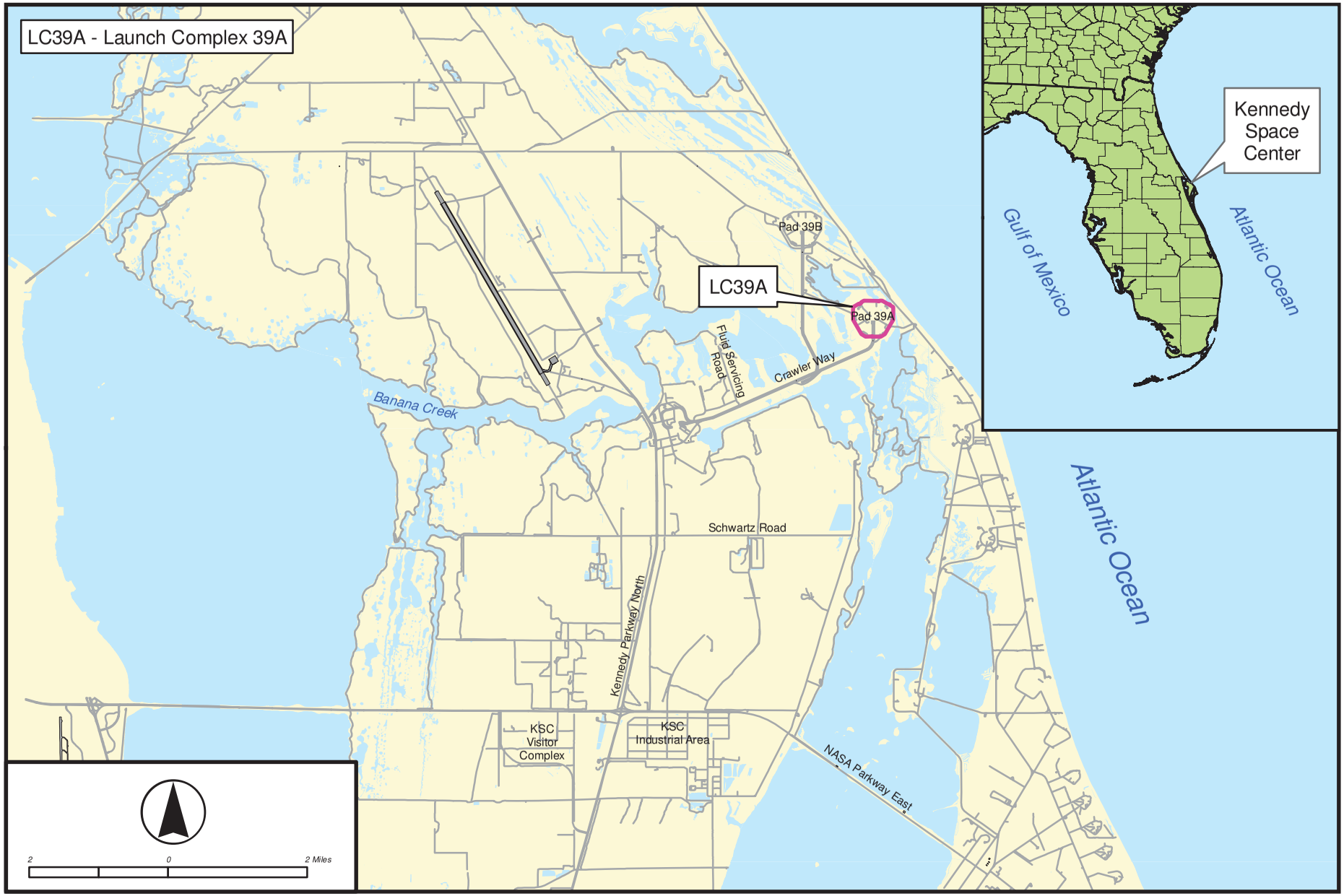
EPR Administrator

Location	**KSC Headquarters, M6-0399, Room 3145**
Mail Code	**ISC-4026**
Phone	**(321)867-2406**
Fax	**(321)867-1175**
Email	**KSC-ISC-DIGPERMIT@mail.nasa.gov**

Emergency requests will be processed on a real time basis
through the ISC Duty Office 861-5050, Fax (861-1627)
or Email - KSC-ISC-DutyOffice@mail.nasa.gov

FIGURE 1 - LOCATION OF KENNEDY SPACE CENTER AND LC39A

LAUNCH COMPLEX 39, PAD A (LC39A), KENNEDY SPACE CENTER, FLORIDA



P:\GIS\KSC_NASA\MAPDOCS\MXD\LC39A_SITE_LOCATION.MXD 10/27/11 KM

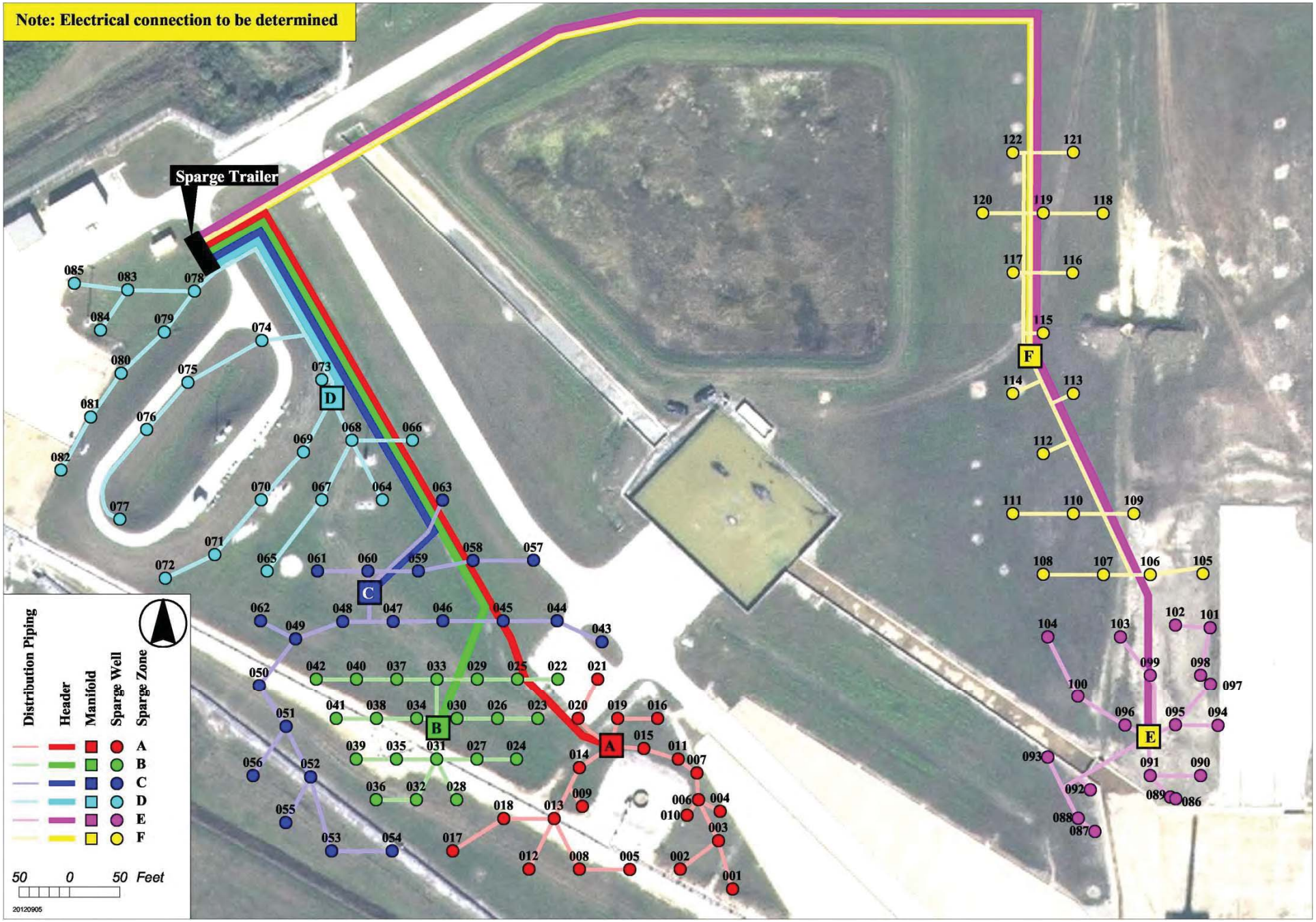


Figure 2 - Air Sparge System Layout

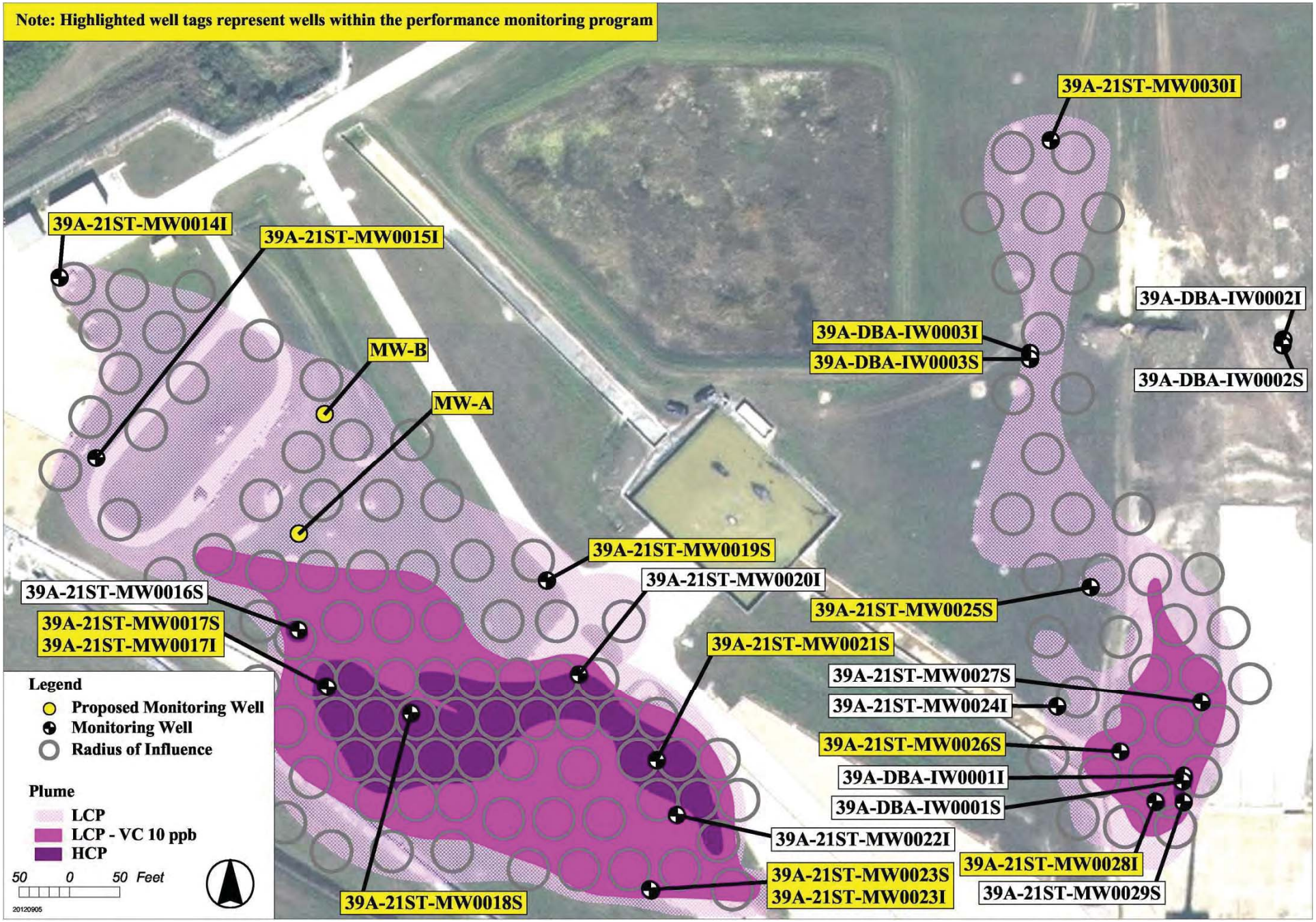
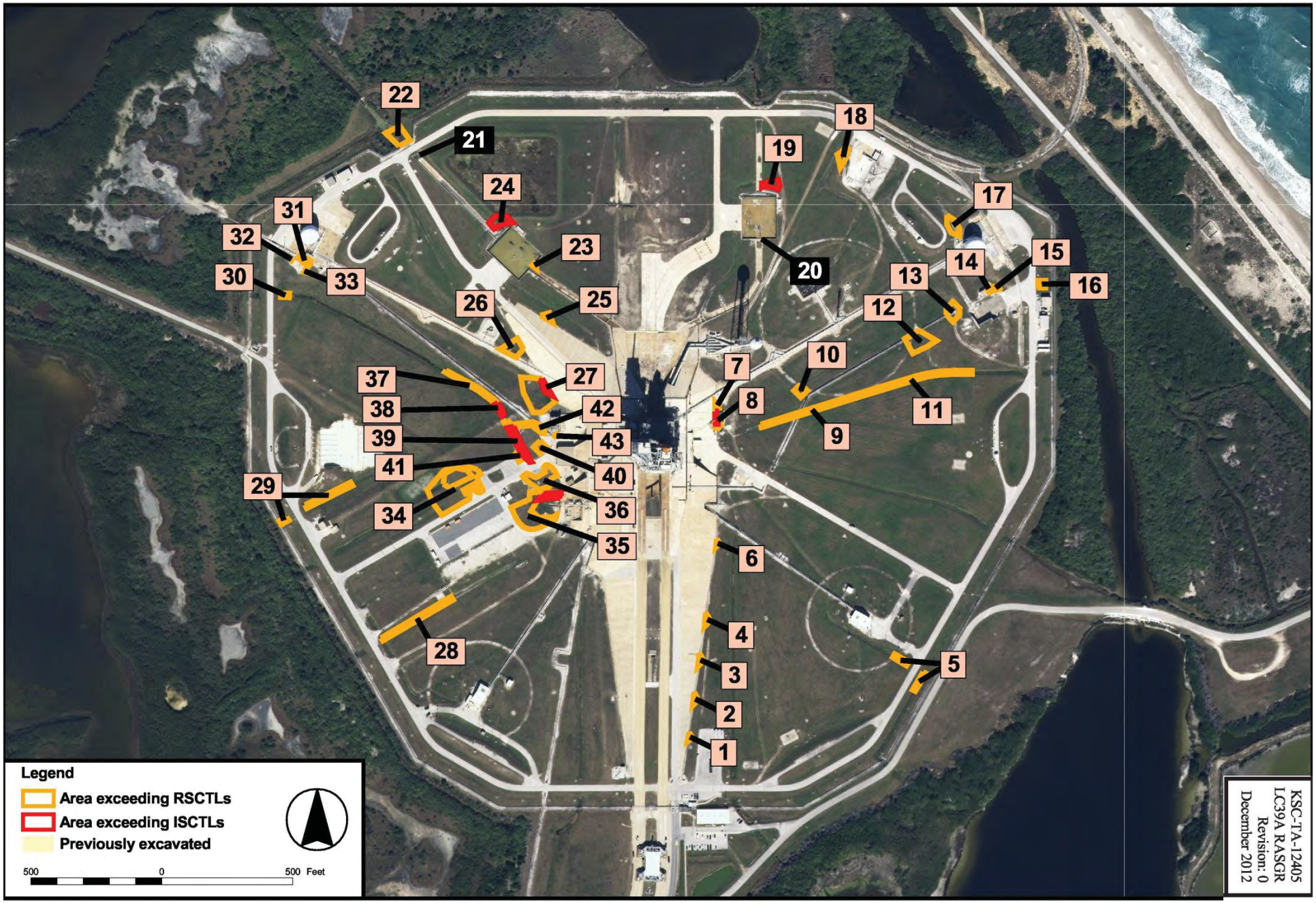


Figure 3 - Proposed Monitoring Well Locations

Figure 4 - Potential Soil Excavation Areas



Logan, Joe

From: Pike, Chris
Sent: Thursday, July 24, 2014 4:10 PM
To: Logan, Joe
Subject: FW: Approved: EPR 16936 Permit Request Submitted by Chris Pike -- EPR
Attachments: Figure-4_2014_4_25_9_18_3_946.pdf; Figure-3_2014_4_25_9_17_56_801.pdf; Figure-2_2014_4_25_9_17_49_375.pdf; Figure-1_2014_4_25_9_17_40_545.pdf

Importance: High

From: Pike, Chris
Sent: Wednesday, July 23, 2014 3:25 PM
To: Neumann, Chris
Cc: Deliz, Michael J. (KSC-TAA4B); Jonnet, Mark; Deliz, Michael J. (KSC-TAA4B)
Subject: FW: Approved: EPR 16936 Permit Request Submitted by Chris Pike -- EPR
Importance: High

Approved Dig Permit. This is for the air sparge and soil excavations.

From: EPR NASA [mailto:ksc-isc-digpermit@mail.nasa.gov]
Sent: Thursday, June 05, 2014 12:01 PM
To: Pike, Chris
Cc: michael.j.deliz@nasa.gov; david.diaz-1@nasa.gov; ksc-isc-digpermit@mail.nasa.gov
Subject: Approved: EPR 16936 Permit Request Submitted by Chris Pike -- EPR
Importance: High

Permit Request: 16936 (Status: Approved)

You must schedule an Excavation Permit Inspector (EPI) to meet with you on site for the utility locate and to obtain the required signature on this permit.

IMPORTANT: Please call at least 72 hours prior to digging. The Excavator shall maintain an approved copy of this permit, signed by the EPI, on site at all times.

Excavation Permit Inspectors (EPI):

Jeff McDowell Phone: (321) 861-6869 Cell: (321) 749-4840
Ryan Ostarly Phone: (321) 861-6946 Cell: (321) 289-2372 FAX: (321) 861-6558

IMPORTANT INFORMATION:

- Excavation Permit Requests will be **immediately cancelled** should digging begin prior to approval from the EPI.
- Orange color paint is assigned to EPIs only unless maintaining the original paint markings.
- Utility Locate/Excavation Permit Requests will be **immediately cancelled** if original EPI paint markings are not maintained.
- You must **hand dig within 24 inches** in either direction of all EPI paint markings.
- **Do not remove or disturb thrust blocks.** A thrust block is a configured piece of concrete located underground at water and sewer utility piping to prevent movement from line pressure fluctuations. When excavating soil at location known to contain buried water or sewer lines, **do not remove any buried concrete without prior approval.**
- Maximum duration of time an EPR can remain in the approval status is one year. All work expecting to extend longer than one year must be re-submitted as a new request, including an updated map and scope of work.
- If the scope of work for the original Utility Locate/Excavation Permit Request is changed or the completion date needs to be extended, you are required to call 867-2406.
- When the job is complete, you are required to call 867-2406. **This permit will be closed upon expiration unless an extension is requested.**
- Accidental Utility line damage, excluding Gas main damage, shall call the ISC Duty Office at 861-5050.
- Accidental Gas Main damage shall call 911, evacuate the area and then call the ISC Duty Office.
- Category Code V Permits must call the ISC Duty office daily and observe all Critical-Days as directed by the ISC Duty Office.

EPR Administrator:

If you have any questions regarding your Utility Locate/Excavation Permit Request, please contact the EPR administrator at the following:

Phone: (321) 867-2406
Fax: (321) 867-1175
Email: KSC-ISC-DIGPERMIT@mail.nasa.gov

Permit Request: 16936 (Status: Approved)

Submitter's Information	
Submitter First Name	Chris
Submitter Last Name	Pike
Submitter Email Address	chris.pike@tetratech.com
Submitter Company Name	Tetra Tech
Submitter Address	661 Andersen Drive, Foster Plaza 7
Submitter City	Pittsburgh
Submitter State	PA
Submitter Zip	15220-2745
Submitter Phone	412-921-8861
Submitter Fax	412-921-4040
Technical Contact Information	
Technical Contact First Name	Mike
Technical Contact Last Name	Deliz
Technical Contact Email Address	michael.j.deliz@nasa.gov
Technical Contact Phone	(321) 867-6971
Technical Contact Fax	(321) 867-4446
NASA COTR Contact Information	
NASA COTR First Name	David

NASA COTR Last Name	Diaz
NASA COTR Email Address	david.diaz-1@nasa.gov
NASA COTR Phone	(321) 861-7816
Permit Request Info	
PermitType	Dig
PermitStatus	Approved
Permit Start Date	05/14/2014
Permit End Date	05/14/2015
Estimated Completion Date	05/05/2015
Scope of Work/Justification	This permit request is for activities within the fenceline of the area designated Launch Complex 39A Pad A (SWMU008), as shown on attached map (Figure 1). Previous environmental investigations were conducted under Excavation Permits 7606 and 8152, both of which have expired. Installation of an air sparge system and a network of air sparge and monitoring wells, and soil excavations are required. This will involve trenching, infrastructure installation (compressed air piping and electrical), and drilling. Soil excavations and trenching will be conducted to a maximum depth of 3-feet below land surface (bls), and drilling will be completed to a maximum depth of 60 feet bls. Above grade features will include monitoring well completion, an air sparge trailer, four above grade piping manifolds, and one piping manifold trailer. Trenching layout and well drilling location areas are shown on Figures 2 and 3. All trenches will be completed with tracer wire installed for future utility location. Soil excavation areas are shown on Figure 4.
Facility Info	
Facility	J8-1708
Grid	J8
Additional Forms and Identifying Numbers	
Environmental Check List Completed	No
Category Codes	
1	III
Related Documents	
File Name	**Description**

Figure-4.pdf	
Figure-3.pdf	
Figure-2.pdf	
Figure-1.pdf	

Reviews			
Reviewed By:	Date:	Results:	Comments:
Locator	4/28/2014 6:56:39 AM	Agree	
Environmental	5/2/2014 3:33:45 PM	Agree	All work must be conducted in accordance with all environmental protocols as stipulated in REC # 9294, (or most recent revision.) AGREE JSS
Master Planner	6/5/2014 12:00:50 PM	Agree	14-0050 in in NASA review loop (6/2/2014) Site Plan 14-0050 in work. Site Plan required. Requester and Technical Contact have been notified - TRL
Final	6/5/2014 12:00:57 PM	Agree	Site Plan 14-0050 has been approved
Map			
Map associated with this request		None	

Permit Request: 16936 (Status: Approved)

Approved by: Jeff McDowell	**Approved by: Ryan Ostarly**
Approved by:	**Approved by:**

[] LOCATED AREA TO BE HAND EXCAVATED ONLY!

Locator's Signature: _____

Reason for Hand Excavation: _____

Permit Request: 16936 (Status: Approved)

EXCAVATION PERMIT CATEGORIES:

If you have questions about assigned category codes contact the Excavation Permit Inspectors at 321-289-7829 or 321-749-4840. Remember - for permits with more than one category code, the most restrictive category code applies.

LAUNCH

For the latest launch, landing or test schedule, contact the ISC Duty Office at 321-861-5050.

Category I *

Seventy-two (72) prior to launch, test or landing, excavation will stop at, around or involving the following KSC facilities:

Launch Control Center - LCC (K6-0900)	Old MILA Area	Communication Distribution and Switching Center - CD&SC (M6-0138)	Operations & Checkout O&C (M6-0355)
LC 39 A & B (all areas and buildings inside the fence) & all 8 Repeater Stations. [1]	Press Site (all buildings, roads, parking areas in and around the area.)	Payload Facility Supporting Launch (M7-0777, & M7-0360) [2]	Central Instrumentation Facility (M6-0342)
VAB Repeater - VABR (K7-1193)	Banana River Repeater Station (M7-0531)	CCF - Converter Compressor Facility (K7-0468)	Shuttle Landing Facility -SLF (runway and all associated buildings and infrastructure)
C-5 Substation (K6-1141)	Tel IV & South Repeater Station (N6-1118)	VAB (K6-0848) and VAB Utility Annex (K6-0947)	

1 - Facilities (J7-0986, J7-1736, J8-2204, K6-1193, K7-0089, K7-0422, K7-0709, M7-0531,& N6-1118).
2 - Mission Specific - Including but not limited to these facilities. (M7-0777 - Transporter/Canister Facility, and M7-0360 - Space Station Processing Facility (SSPF)).

Excavation may resume at facilities 1-15 four hours after launch. Excavation will not occur at the SLF (16) until after landing.

Category II

LC-39 Active Pads - All excavation (except emergencies) will stop when the launch vehicle rolls out to the Pad. Excavation may resume following Pad safing and washdown after launch.

Category III

LC-39 Deactive Pads - Excavation will cease 2 hours before sunset on Launch -1 day, or 12 hours prior to Launch from Active Pad, whichever is earlier. Excavation may resume 4 hours after launch from the active pad.

Category IV

Excavation may proceed in all areas and times not covered by Categories I, II or III.

Category V

You must call the ISC Duty Office at 321-861-5050 ***DAILY*** *prior to digging*

Air Force Launch Operations - Excavation and switching of critical power will cease on launch critical days (L-1, launch count to include launch day, and program specific test days) at the following KSC facilities and utilities:

Kennedy Parkway, NASA Parkway & Saturn Causeway utility corridors	Tel IV & South Repeater Station (N6-1118)	Banana River Repeater Station (M7-0531)	Utility Corridors East of Orsino Substation serving CCAFS	Area south from LC-39B along Phillips Parkway.
All Camera, Radar & Weather Sites	Shuttle Landing Facility	KARS Park	Pump Station 7 (K8-1740)	Old MILA Area
Press Site (all buildings, roads, parking areas in and around the area)		Complex 41 (all facilities and areas	Area east from the Converter Compressor Facility -CCF (K7-0468) to Pad 39A	

	inside the fence)	

LANDING

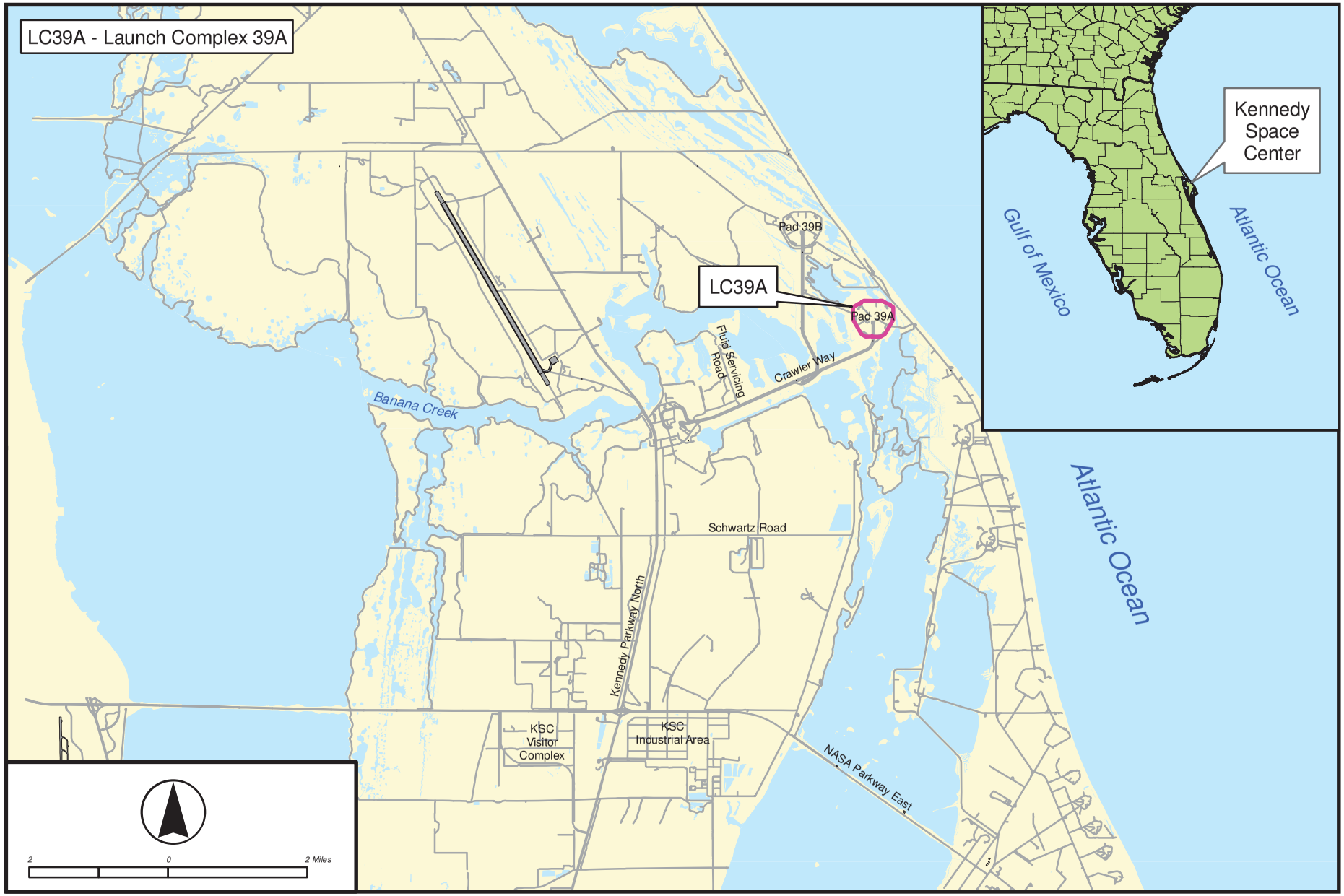
For the latest launch, test or landing schedule, contact the ISC Duty Office at 321-861-5050.

Category VI

Except for the SLF, excavation may proceed in all areas up to 2 hours prior to sunset on landing -1 day, or 12 hours prior to landing, whichever is earlier. Excavation may proceed at all facilities, except for the SLF, 1 hour after a successful landing. Excavation will stop at, around and/or involving the SLF and involved facilities, at the start of Launch Countdown. Excavation may proceed in this area after Landing, AND with approval from the SLF Operations at 867-2100.

FIGURE 1 - LOCATION OF KENNEDY SPACE CENTER AND LC39A

LAUNCH COMPLEX 39, PAD A (LC39A), KENNEDY SPACE CENTER, FLORIDA



P:\GIS\KSC_NASA\MAPDOCS\MXD\LC39A_SITE_LOCATION.MXD 10/27/11 KM

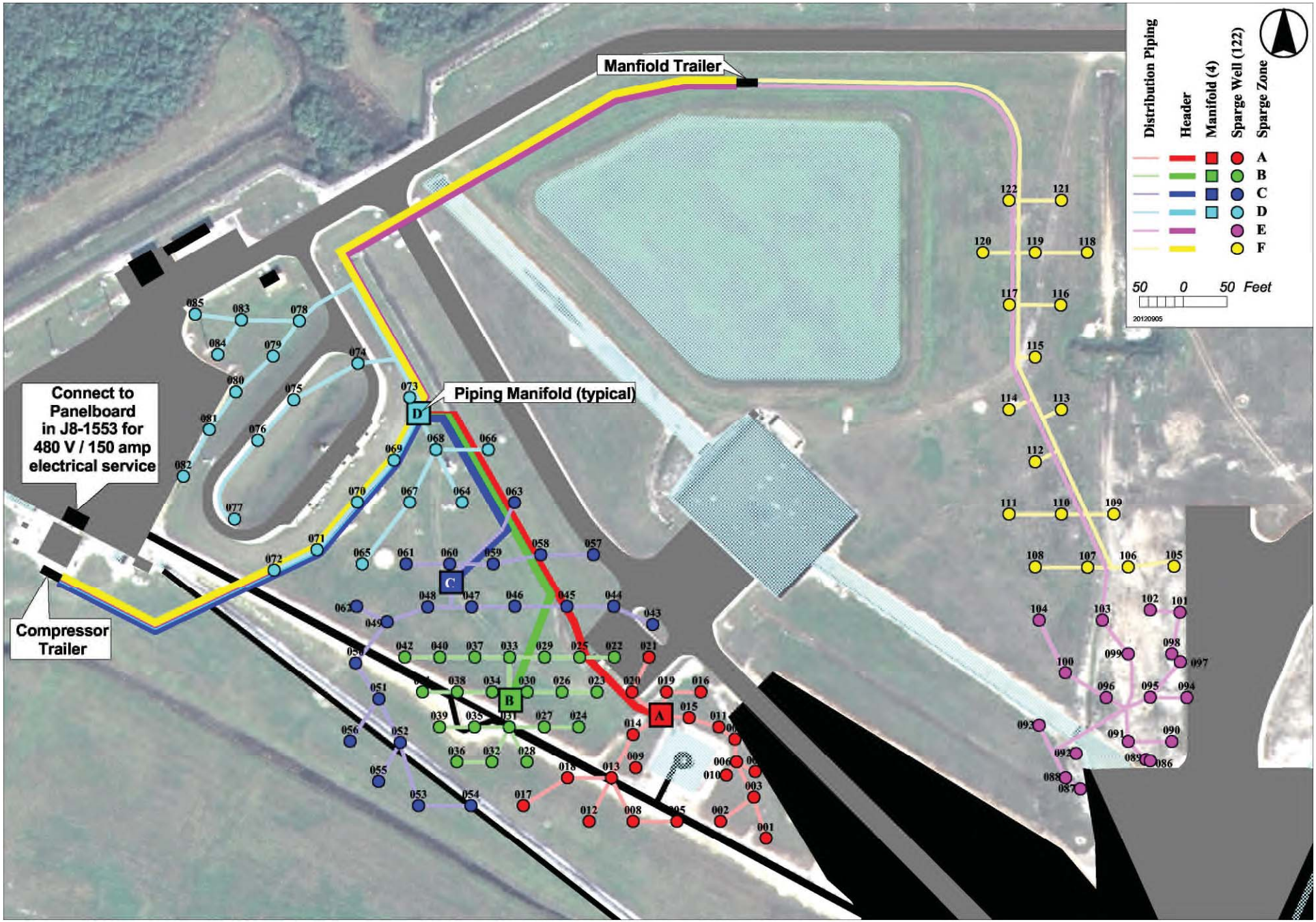


Figure 2 - Air Sparge System Layout

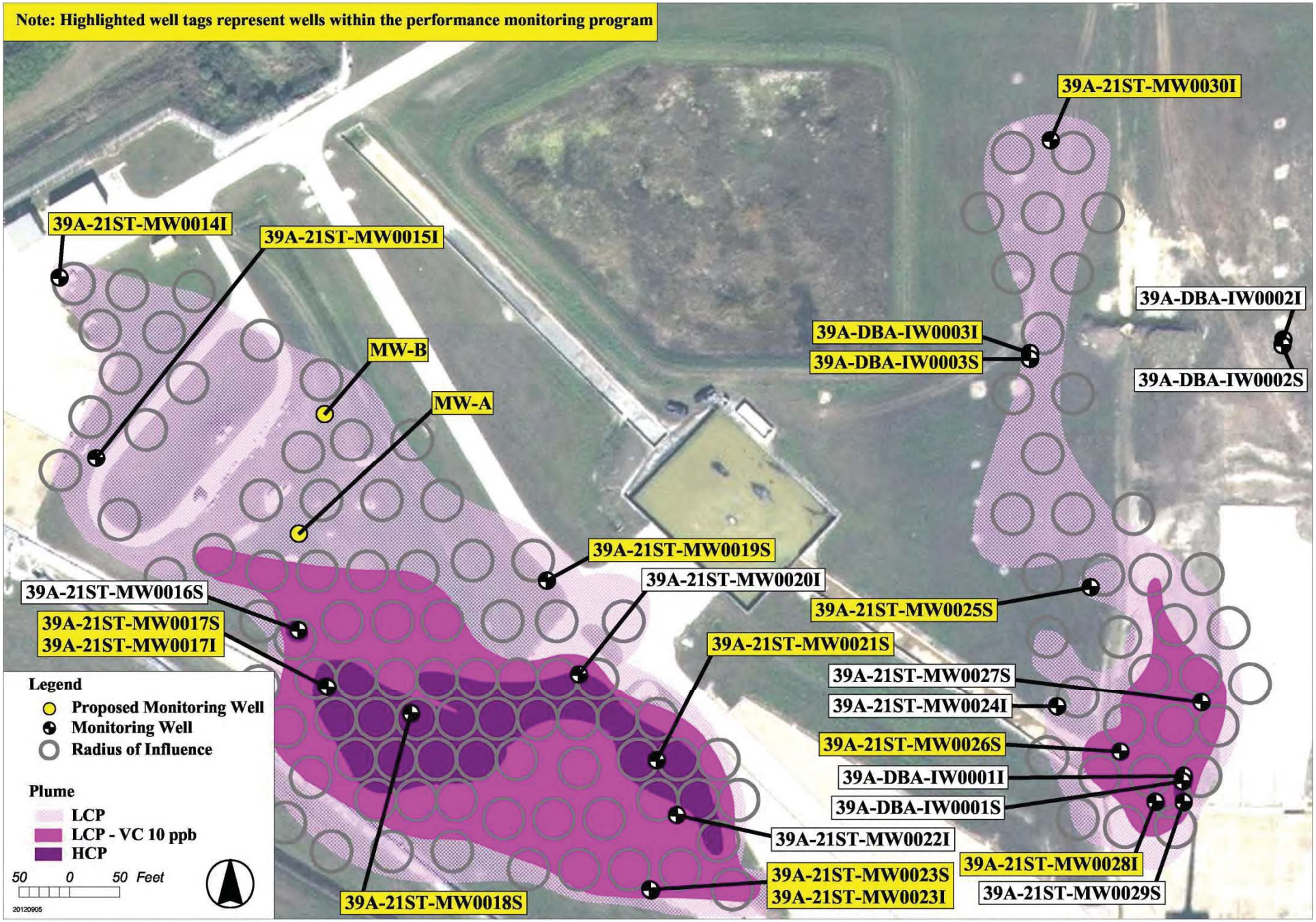
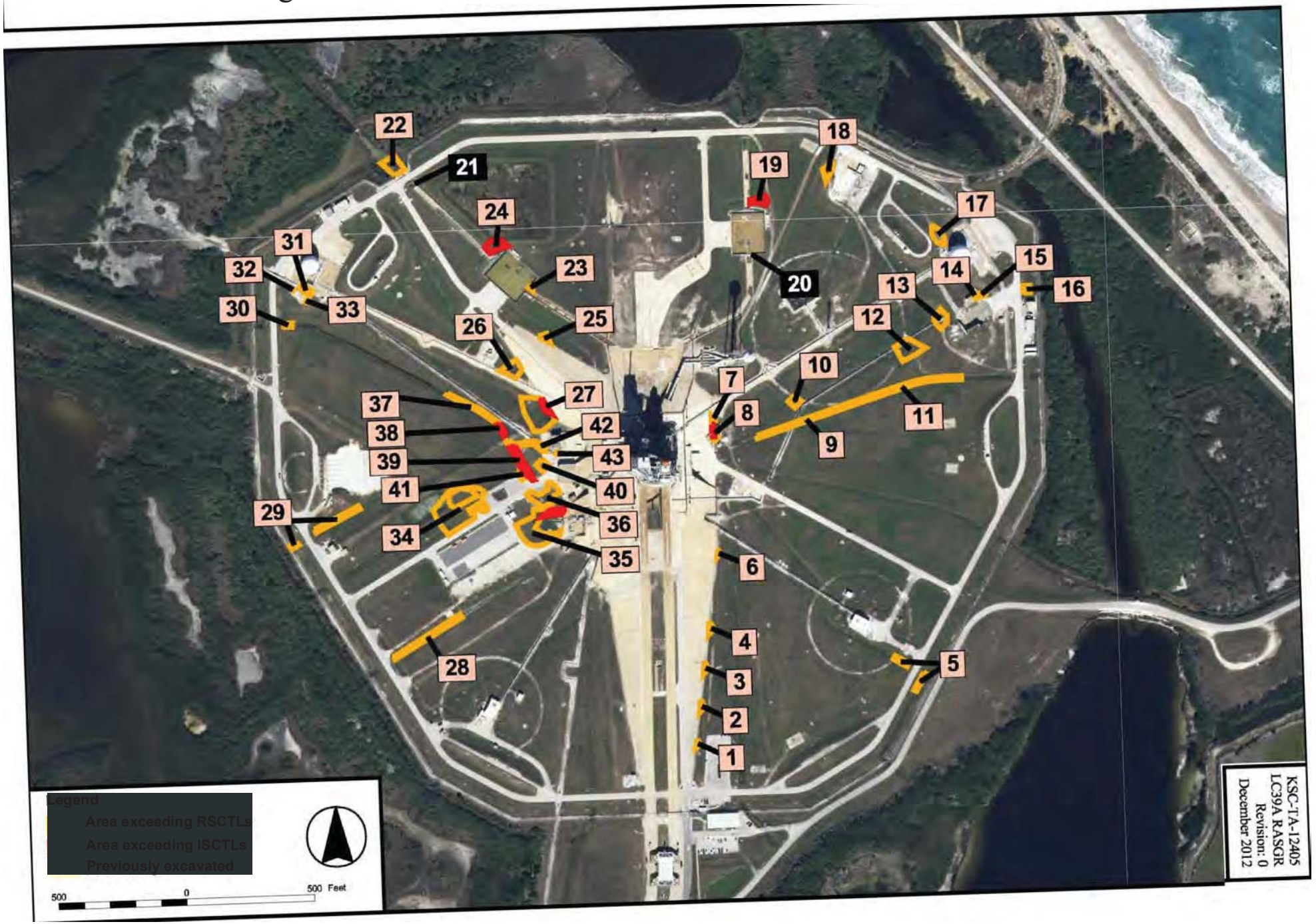


Figure 3 - Proposed Monitoring Well Locations

Figure 4 - Potential Soil Excavation Areas



FLORIDA DEPARTMENT OF HEALTH – BREVARD COUNTY
Environmental Health Services
2725 Judge Fran Jamieson Way, Suite A116
Viera, Florida 32940-6605
PHONE: 321/633-2100 FAX: 321/633-2151
www.BrevardEH.com

WELL CONSTRUCTION PERMIT

Permit Number: 39762
Purpose: MONITORING WELL: (2) OR MORE ON ONE SITE/FACILITY
Subdivision/Lot#: 2 WELLS
Well Site Address: LC-39A
KENNEDY SPACE CENTER FL

Application Date: 8/11/2014
Expiration Date: 8/11/2015
Permit Fee: $100.00

Well Contractor: Groundwater Protection, Hinst **WWC #:** 9311 **WWC Phone #:** 407-426-7885

Owner Name: UNITED STATES GOVERNMENT
Owner Address: PO BOX 366
TITUSVILLE FL 32781-
Suite/Unit#:
Owner Phone #:

Issuance of this permit does not relieve the well owner of meeting the permit requirements of county, municipal, or other legally constituted authorities. The well contractor must meet the well set-back per Chapter 62-532, F.A.C., Table 1. Any variance from these setbacks or change to site plan must be approved in advance by Environmental Health Services.

Inspection Details:

Circle One: OSTDS or Sewer

Foundation Setback: _____'

- ☐ Site Plan
- ☐ Well ID Tag
- ☐ Casing Height _____"
- ☐ Grout Depth _____"
- ☐ Completion Report ____/____/____
- ☐ OSTDS Site Setback _____'
- ☐ OSTDS AP Setback _____'
- ☐ OSTDS/Well - Final ____/____/____
- ☐ Bacteriological Result ____/____/____
- ☐ Nitrate Result ____/____/____
- ☐ Variance Application Date ____/____/____
- ☐ Variance Approval Date ____/____/____
- ☐ Warning Notice Sent ____/____/____
- ☐ Compliance Letter Sent ____/____/____
- ☐ Other: _____

Notes:

	Original Site Visit	Construction Date	Re-inspection Date	Final Date
Date				
Initials				

THIS PERMIT IS ISSUED BY THE AUTHORIZED REPRESENTATIVE OF THE FLORIDA DEPARTMENT OF HEALTH UNDER THE AUTHORITY OF CHAPTER 381, 402, 403, 513, 514, AND 489 PARTIII, FLORIDA STATUTES, FLORIDA ADMINISTRATIVE CODE AND BREVARD COUNTY CODE SECTION 46-36 THRU 46-72 ARTICLE II: ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS AND WATER WELL PERMITTING. THIS PERMIT IS SUBJECT TO SUSPENSION OR REVOCATION WHEN IT IS DETERMINED BY THE DEPARTMENT THAT THE OPERATION, CONDITIONS AND/OR DEPARTMENT STANDARDS ARE NOT BEING MET.

DISPLAY IN A CONSPICUOUS PLACE – THIS PERMIT IS NON-TRANSFERABLE

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
■ Delegated Authority (if Applicable): Brevard County

PLEASE FILL OUT ALL APPLICABLE FIELDS
(* Denotes Required FieldS Where Applicable)

Date Stamp

Official Use Only

1. *Permit Number 39762 CUP/WUP No. _____ DID Number _____ 62-524 Delineation No. _____

2. * Number of permitted wells constructed, repaired, or abandoned 2 * Number of permitted wells not constructed, repaired, or abandoned 0

3. * Owner's Name United State Gov't. 4. * Completion Date 8/28/2014 5. Florida Unique ID _____

6. LC-39A - Kennedy Space Center
* Well Location - Address, Road Name or Number, City, ZIP

7. * County Brevard * Section 3 Land Grant _____ * Township 22S * Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: _____ GPS _____ Map _____ Survey Datum: _____ NAD 27 _____ NAD 83 _____ WGS 84

10* TYPE OF WORK: X Construction ____ Repair ____ Modification ____ Abandonment

11. Specify Intended Use(s) of Well(s):

____ Domestic	____ Landscape Irrigation	____ Agricultural Irrigation	____ Site Investigation
____ Bottled Water Supply	____ Recreation Area Irrigation	____ Livestock	X Monitoring
____ Public Water Supply (Limited Use/DOH)		____ Nursery Irrigation	____ Test
____ Public Water Supply (Community or Non Community/DEP)		____ Commercial / Industrial	____ Earth - Coupled Geothermal
____ Class I Injection		____ Golf Course Irrigation	____ HVAC Supply
			____ HVAC Return

Class V Injection: ____ Recharge ____ Commercial/Industrial Disposal ____ Aquifer Storage & Recovery ____ Drainage
Remediation: ____ Recovery ____ Air Sparge ____ Other (Describe) _____
____ Other (Describe) _____

12. *Drill Method: ____ Auger ____ Cable Tool ____ Rotary ____ Combination (Two or More Methods) ____ Jetted X Sonic
____ Horizontal Drilling ____ Hydraulic Point (Direct Push) ____ Other _____

13. *Measured Static Water Level ____ ft. Measured Pumping Water Level NA ft. After NA Hours a NA GPM

14. *Measuring Point (Describe) Land Surface Which is 0 ft. ____ Above ____ Below Land Surface * Flowing ____ Yes X No

15.* Casing Material: ____ Black Steel ____ Galvanized X PVC ____ Stainless Steel ____ Not Cased Other _____

16.* Total Well Depth: 28 ft. Cased Depth 23 ft. Open Hole From: NA to NA ft. Screen: From 23 to 28 ft. Slot Size 0.010

*** ABANDONMENT** ____ **OTHER (Explain)** _____

From ____ ft.	To ____ ft.	No of Bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other		
From ____ ft.	To ____ ft.	No of Bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other		
From ____ ft.	To ____ ft.	No of Bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other		
From ____ ft.	To ____ ft.	No of Bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other		
From ____ ft.	To ____ ft.	No of Bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other		

*** SURFACE CASING DIAMETER & DEPTH**

Diam. ____ in.	From ____ ft.	To ____ ft.	# of bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other	
Diam. ____ in.	From ____ ft.	To ____ ft.	# of bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other	

*** PRIMARY CASING DIAMETER & DEPTH**

Diam. 1 in.	From 0 ft.	To 22 ft.	# of bags 1	Seal Material (Check One): X	Neat Cement	____ Bentonite	____ Other	
Diam. ____ in.	From ____ ft.	To ____ ft.	# of bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other	
Diam. ____ in.	From ____ ft.	To ____ ft.	# of bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other	

*** LINER CASING DIAMETER & DEPTH**

Diam. ____ in.	From ____ ft.	To ____ ft.	# of bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other	
Diam. ____ in.	From ____ ft.	To ____ ft.	# of bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other	

*** TELESCOPE CASING DIAMETER & DEPTH**

Diam. ____ in.	From ____ ft.	To ____ ft.	# of bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other	
Diam. ____ in.	From ____ ft.	To ____ ft.	# of bags ____	Seal Material (Check One): ____	Neat Cement	____ Bentonite	____ Other	

PUMP TYPE (If Known)
____ Centrifugal ____ Jet ____ Submersible ____ Turbine
Horsepower ____ Pump Capacity (GPM) ____
Pump depth ____ ft. Intake Depth ____ ft.

CHEMICAL ANALYSIS (When Required)
Iron ____ ppm Sulfate ____ ppm Chloride ____ ppm
____ Laboratory Test ____ Field Test Kit

WATER WELL CONTRACTOR

* Contractor Name: James Hinst * License No. 9311 Email Address: Jim@drillprollc.com

*Contractor's Signature: James Hinst * Driller's Name: Dave Longino

I certify that the information in this report is accurate & true.

* Permit No. 39762

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
2379 BROAD STREET, BROOKSVILLE, FL 34604-6899
PHONE (352) 796-7211 OR (800) 423-1476
WWW.SWFWMD.STATE.FL.US

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
4049 REID STREET, PALATKA, FL 32178-1427
PHONE: (386) 329-4500
WWW.SJRWMD.COM

NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT
152 WATER MANAGEMENT DR., HAVANA FL 32333-4712
(US HIGHWAY 90, 10 MILES WEST OF TALLAHASSEE)
PHONE: (850) 539-5999
WWW.NWFWMD.STATE.FL.US

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
P.O. BOX 24680
3301 GUN CLUB ROAD
WEST PALM BEACH, FL 33416-4680
PHONE: (561) 686-8800
WWW.SFWMD.GOV

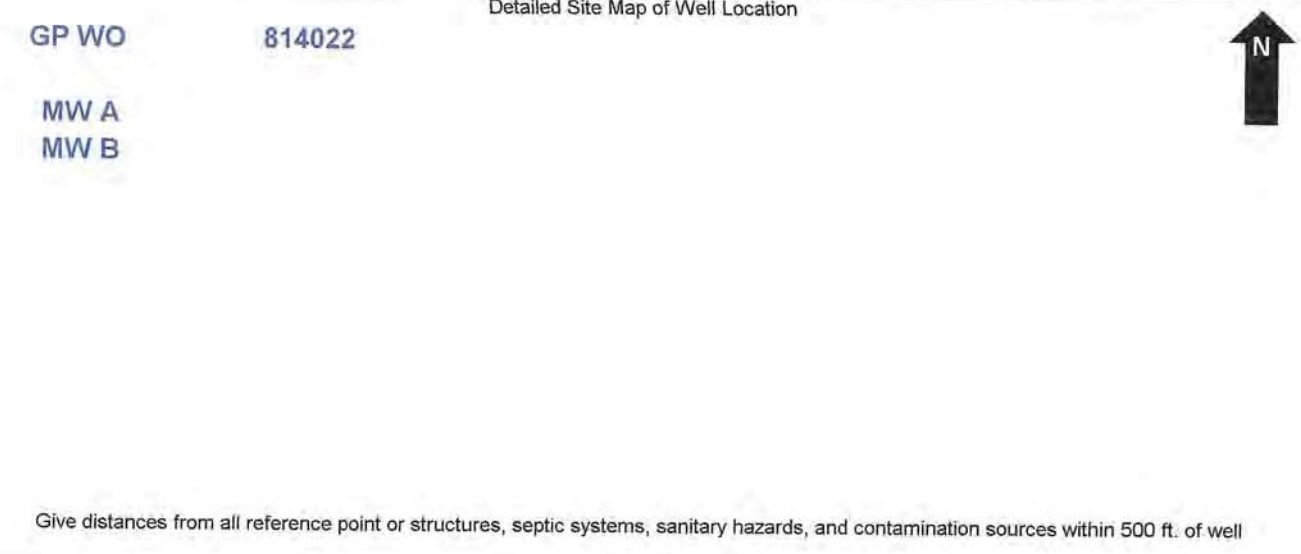
SUWANNEE RIVER WATER MANAGEMENT DISTRICE
9225 CR 49
LIVE OAK, FL 32060
PHONE: (386) 362-1001 OR (800) 226-1066 (FLORIDA ONLY)
WWW.MYSUWANNEERIVER.COM

DRILL CUTTINGS LOG (Examine cuttings every 20 ft. or at formation changes. Note cavities and depth to producing zones.

From	0	ft. To	5	ft. Color	Tan	Grain Size (F, M, C)	F/M	Material	Sand with Shell Lenses, Saturated at 3'
From	5	ft. To	17	ft. Color	Tan	Grain Size (F, M, C)	F/M	Material	Sand Containing Shell, Wet
From	17	ft. To	30	ft. Color	Grey	Grain Size (F, M, C)	F	Material	Sand, Saturated
From	30	ft. To	37	ft. Color	Green	Grain Size (F, M, C)	F/M	Material	Clay, Wet
From		ft. To		ft. Color		Grain Size (F, M, C)		Material	
From		ft. To		ft. Color		Grain Size (F, M, C)		Material	
From		ft. To		ft. Color		Grain Size (F, M, C)		Material	
From		ft. To		ft. Color		Grain Size (F, M, C)		Material	
From		ft. To		ft. Color		Grain Size (F, M, C)		Material	
From		ft. To		ft. Color		Grain Size (F, M, C)		Material	
From		ft. To		ft. Color		Grain Size (F, M, C)		Material	
From		ft. To		ft. Color		Grain Size (F, M, C)		Material	

COMMENTS

Detailed Site Map of Well Location



Give distances from all reference point or structures, septic systems, sanitary hazards, and contamination sources within 500 ft. of well

APPENDIX D

FIELD FORMS

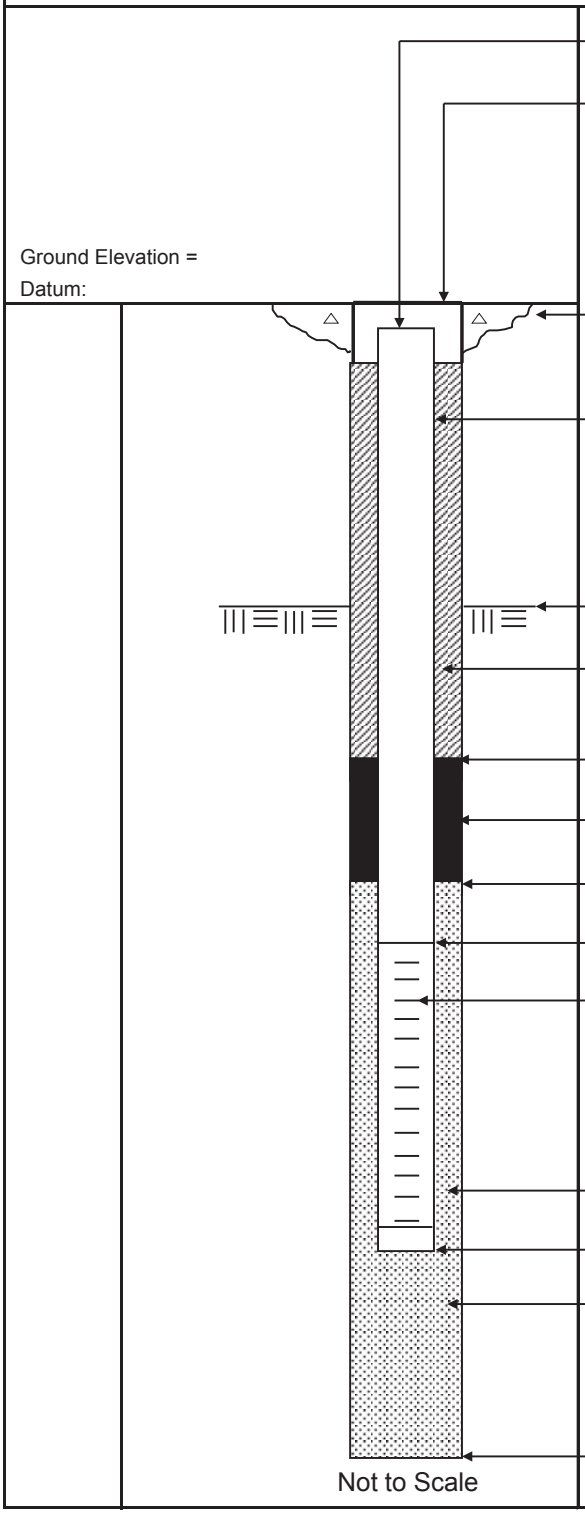
PROVIDED IN ELECTRONIC VERSION ONLY

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0001
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/18/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

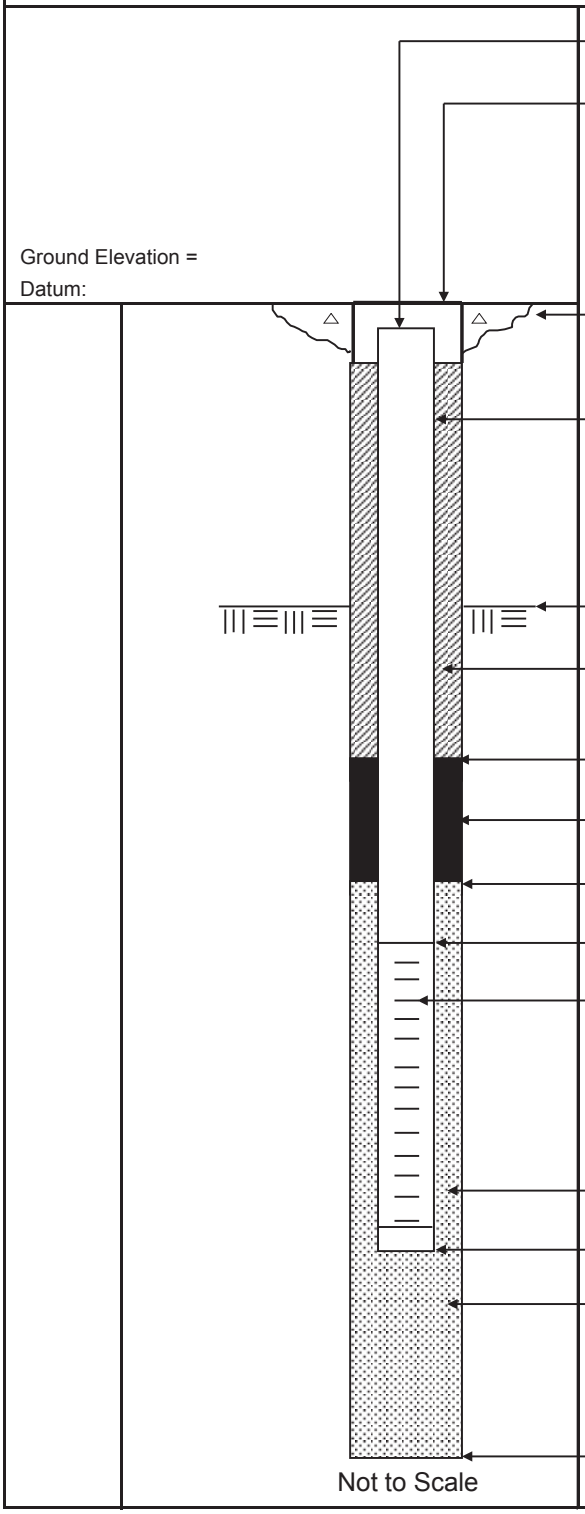
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0002
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/18/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

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Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

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Type of Backfill Below Well: Bentonite

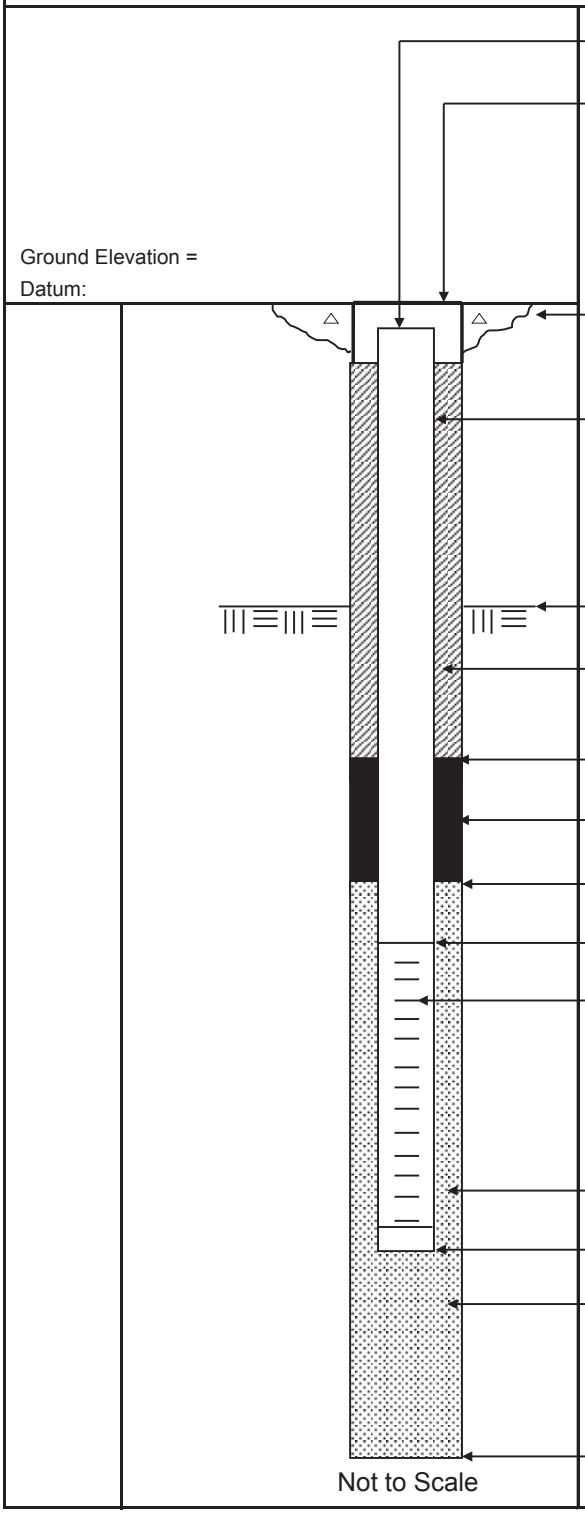
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0003
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/18/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

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I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

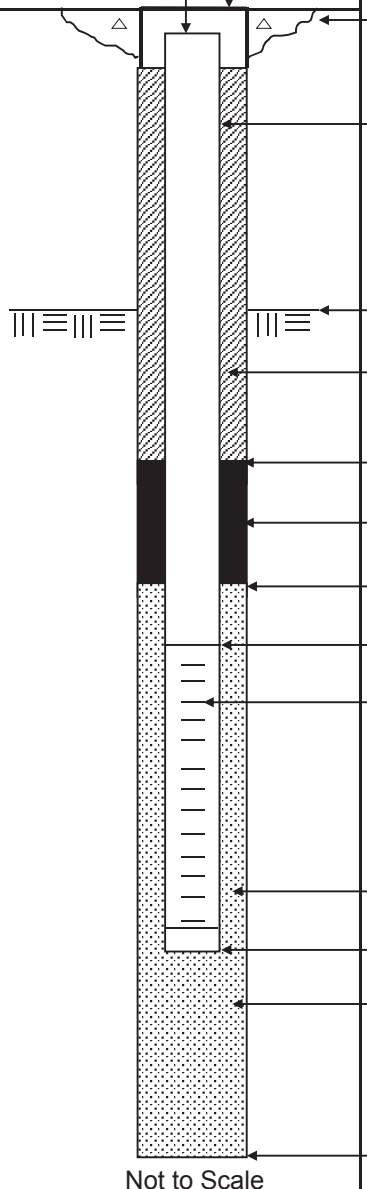
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0004
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/18/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal:

Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

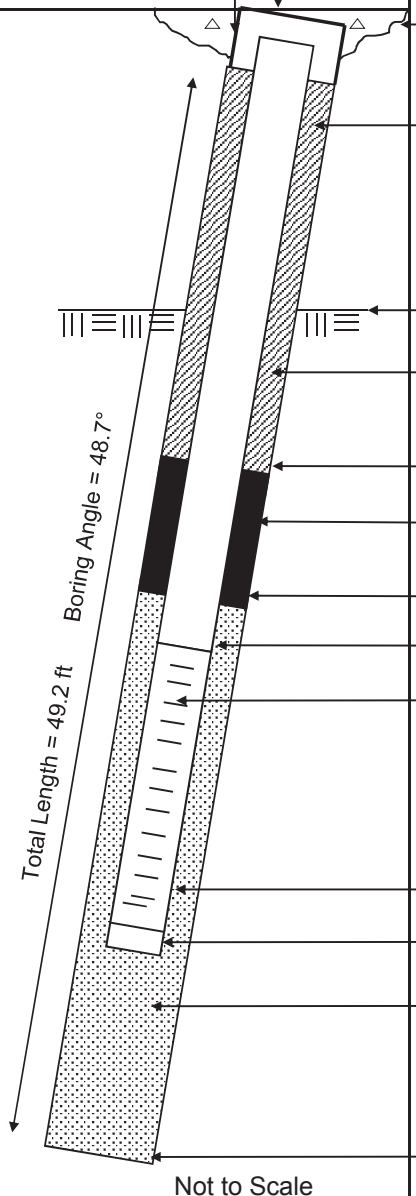
Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 48.7 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0005
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

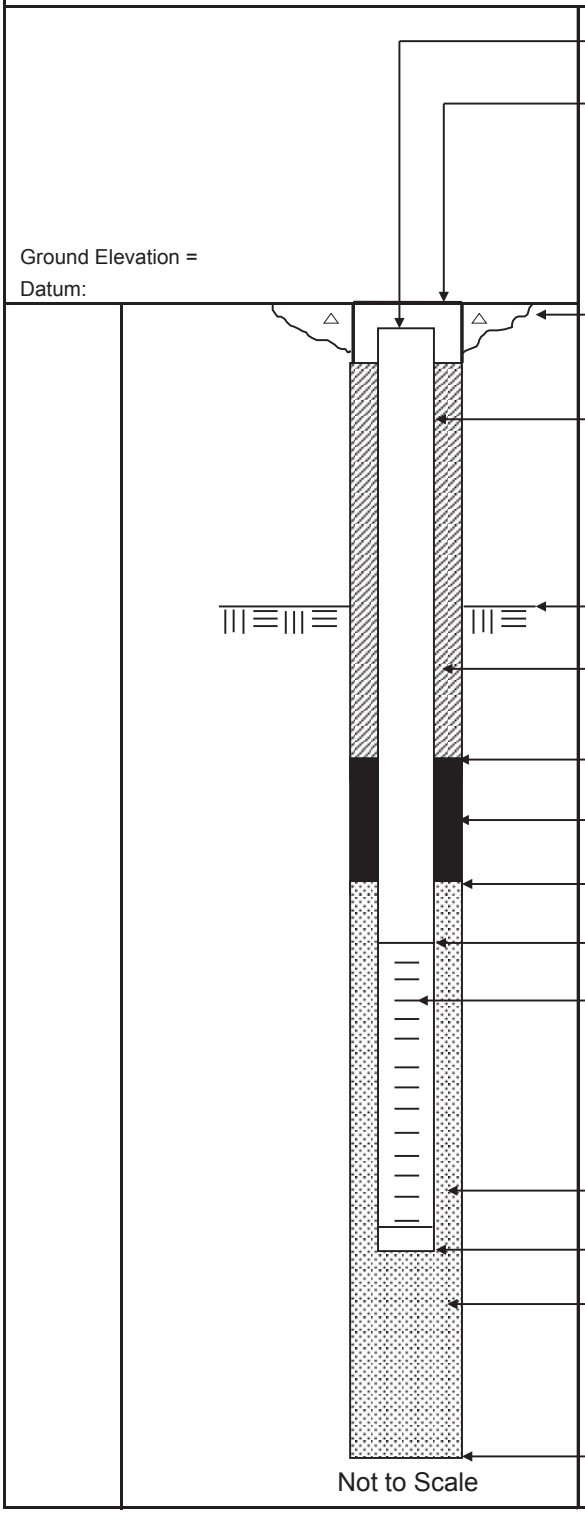
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0006
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

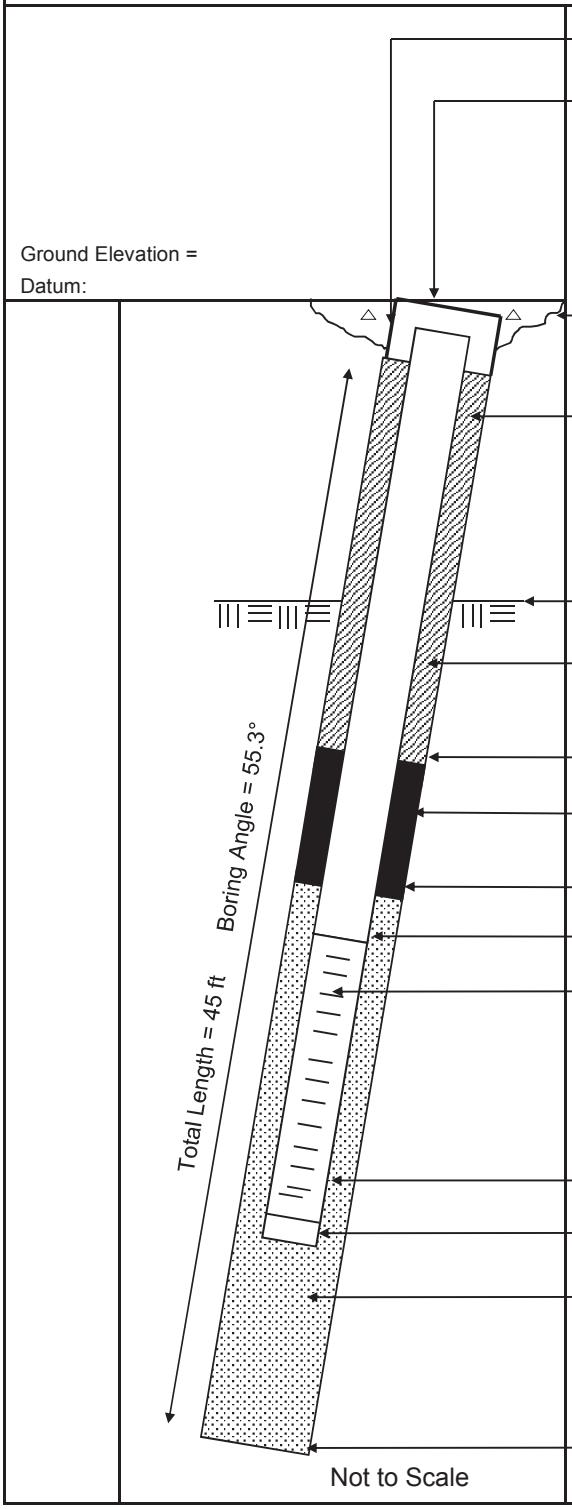
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 55.3 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0007
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

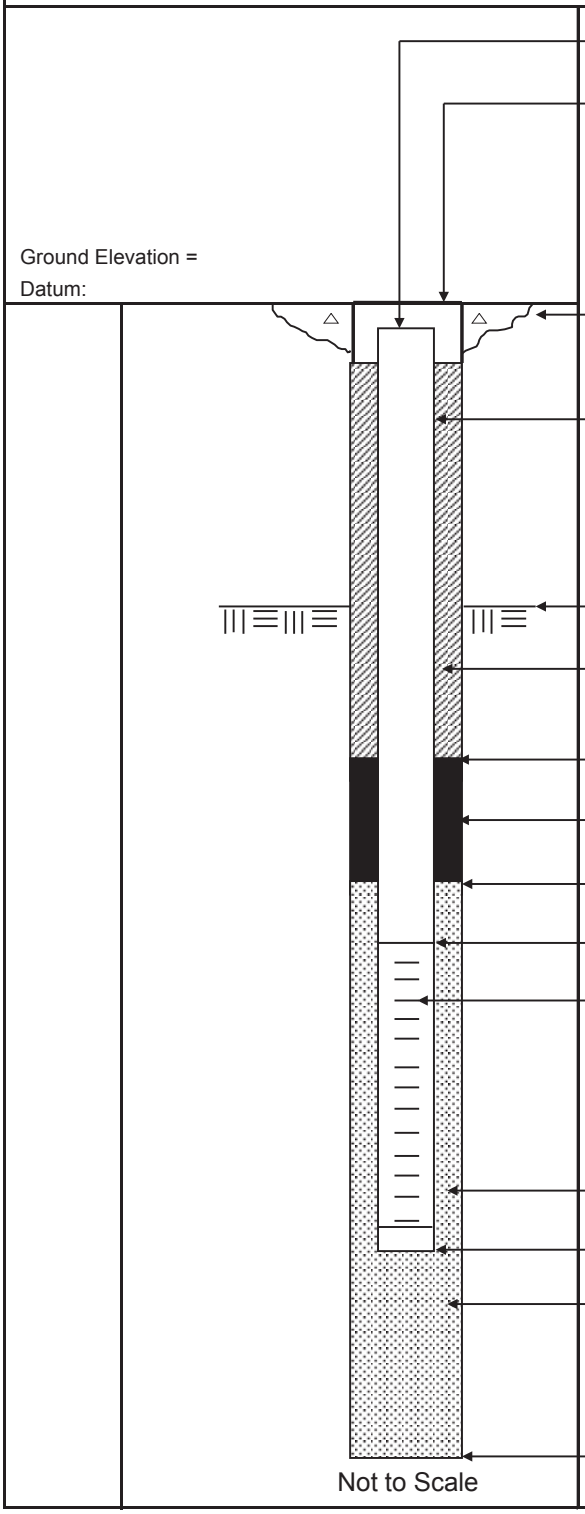
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0008
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

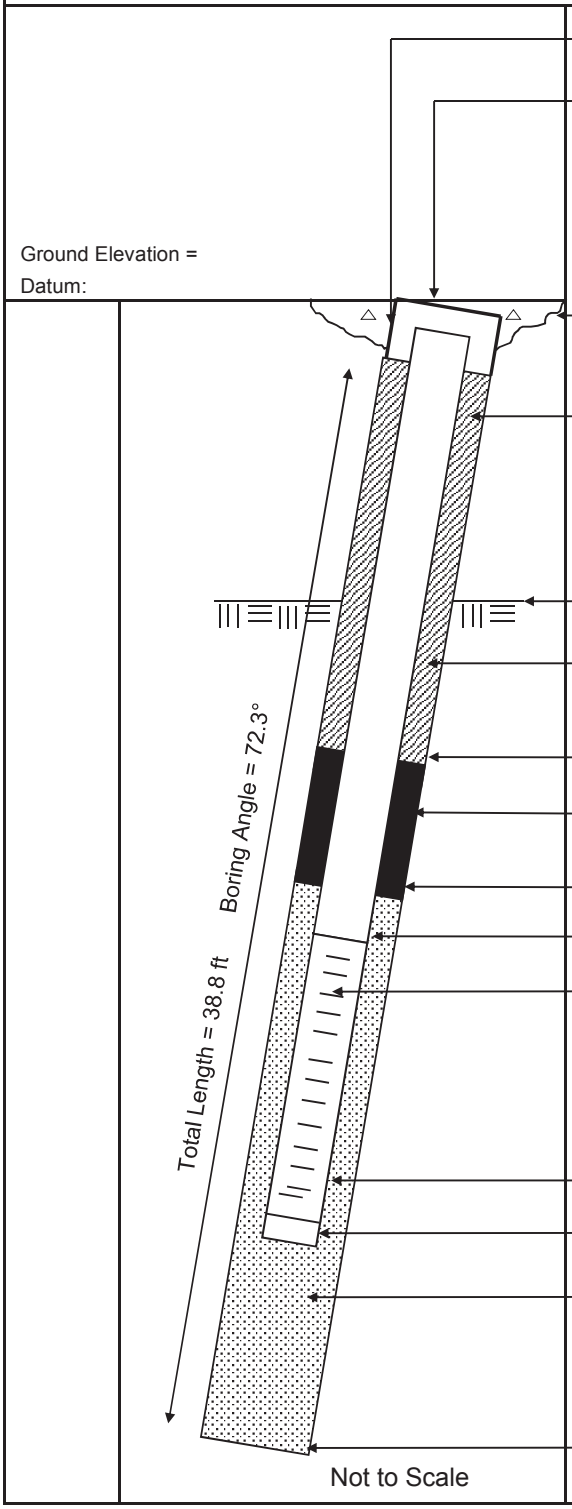
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 72.3 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0009
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

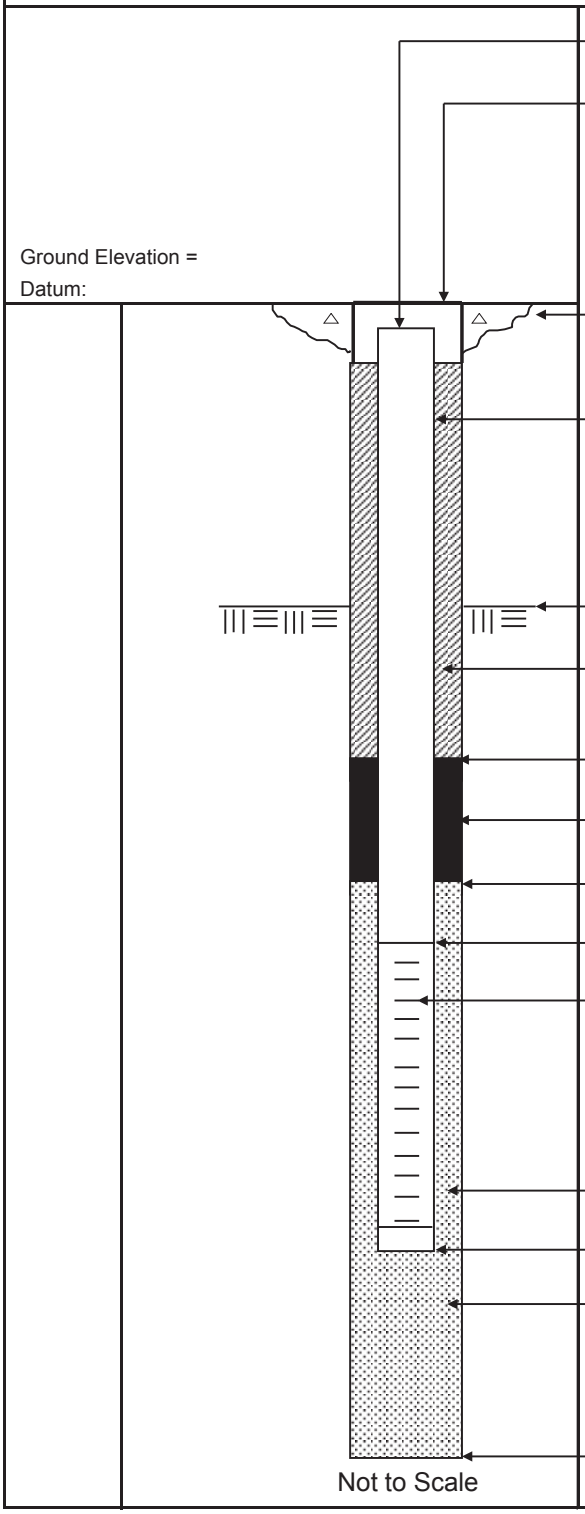
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0010
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

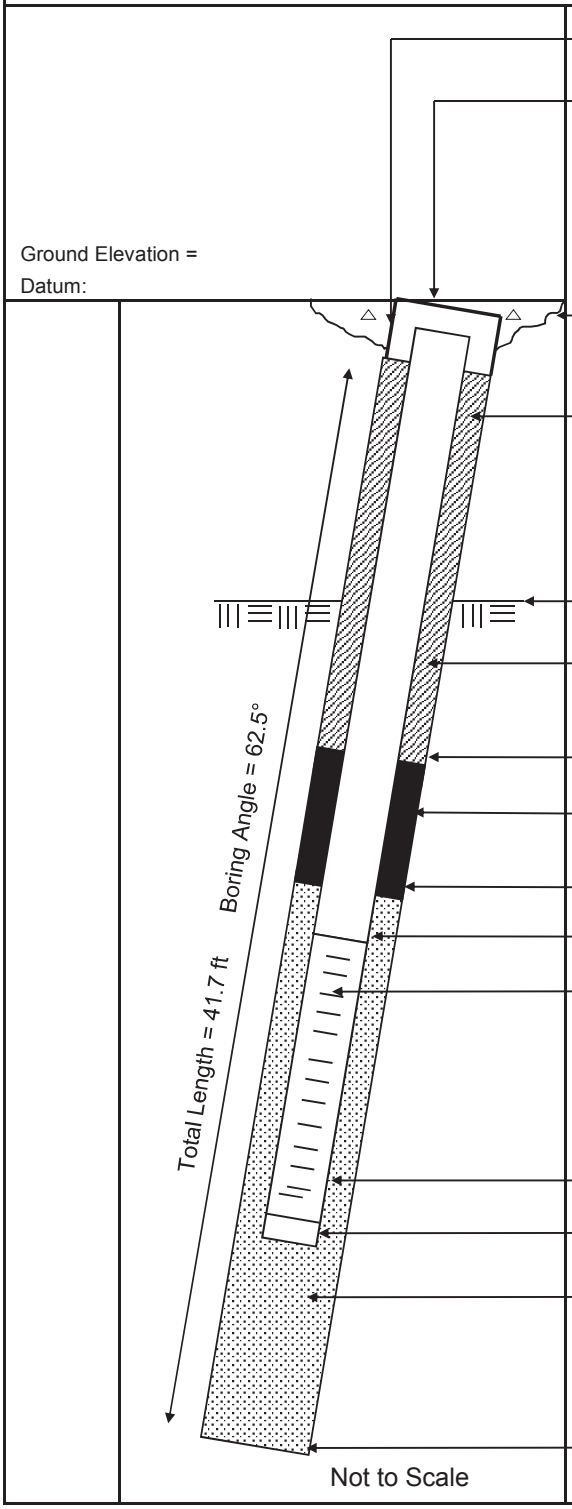
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 62.5 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0011
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

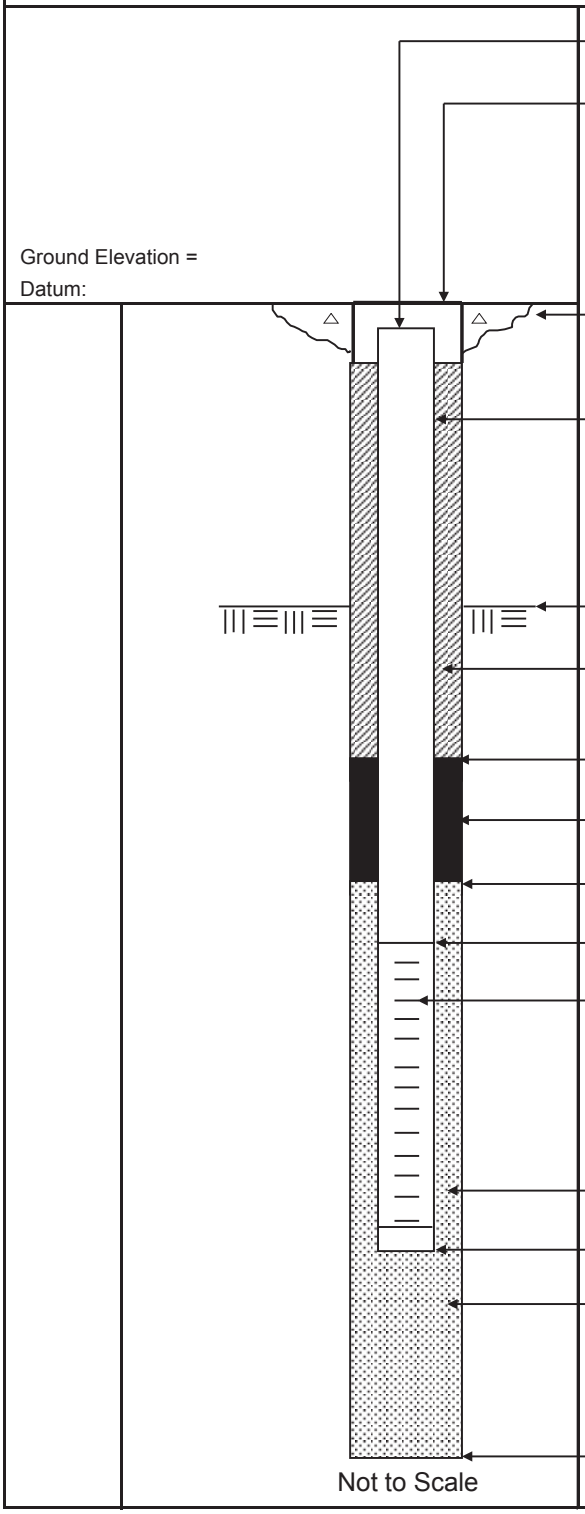
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0012
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/18/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

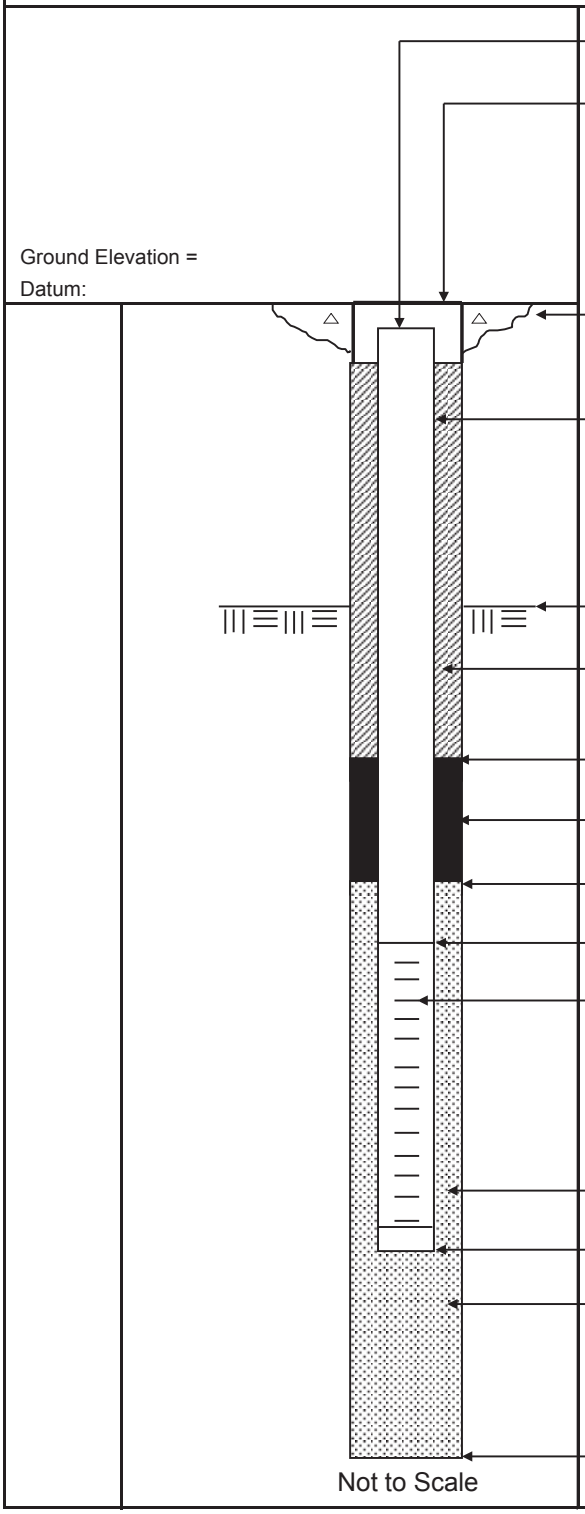
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0013
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/18/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

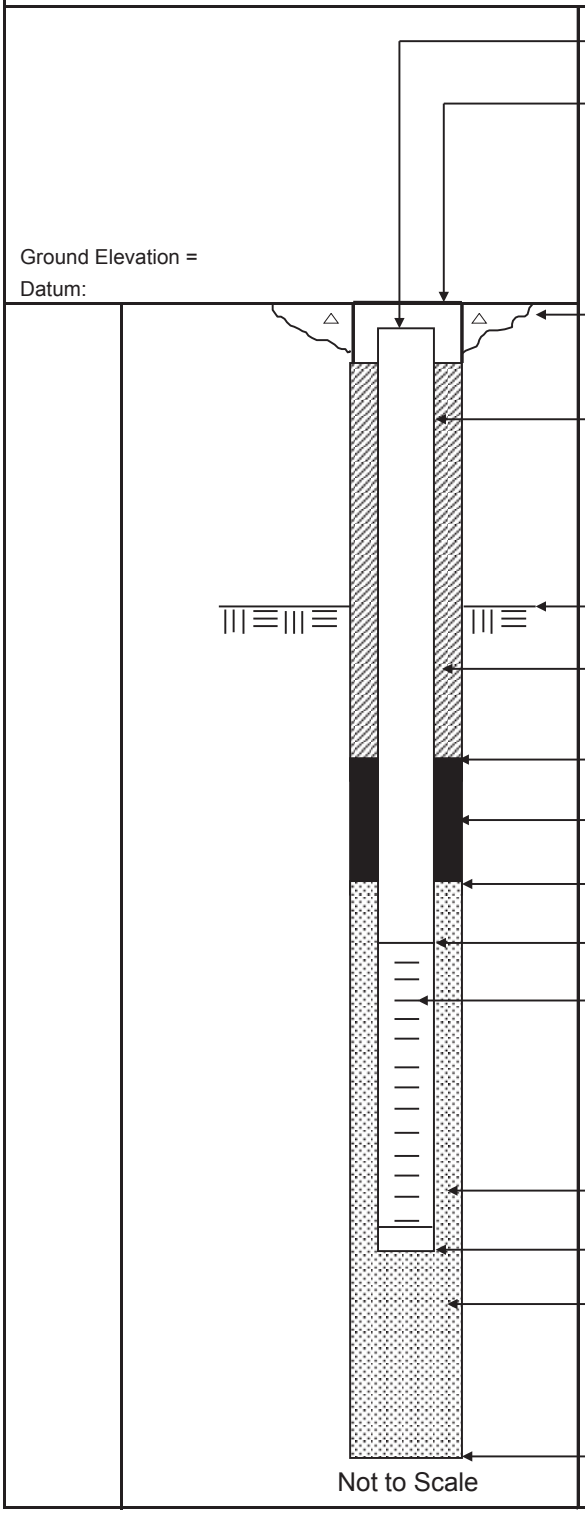
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0014
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

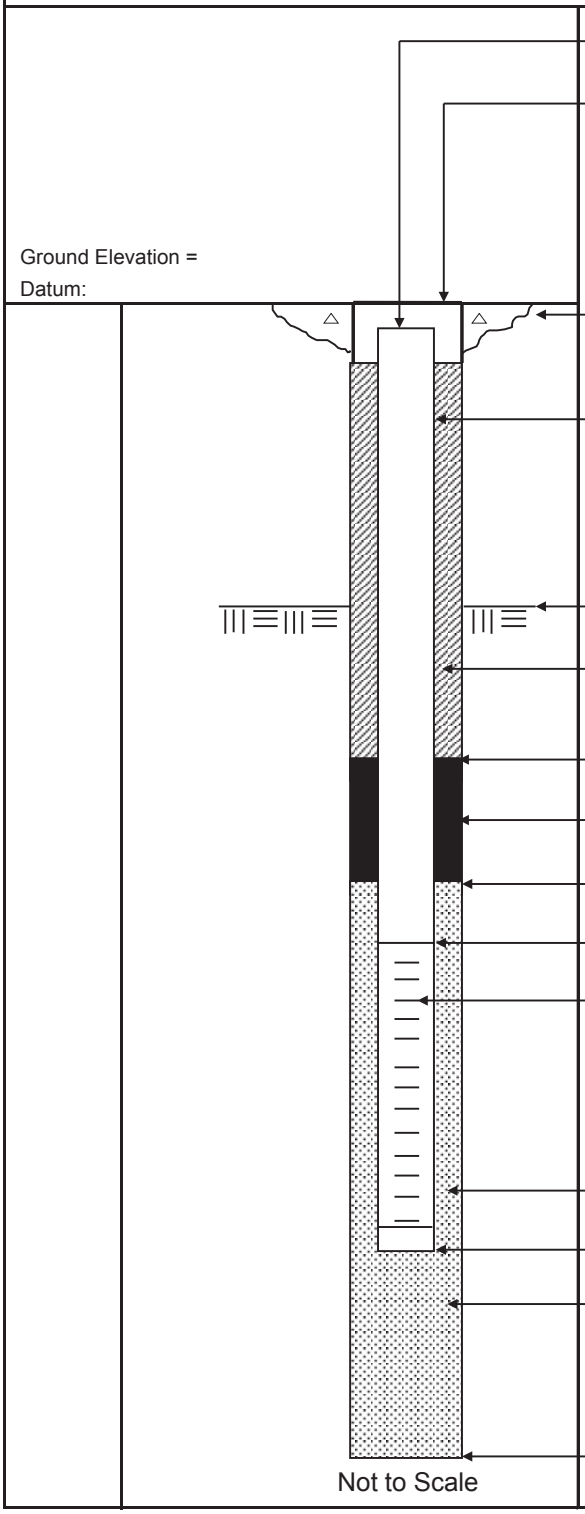
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0015
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

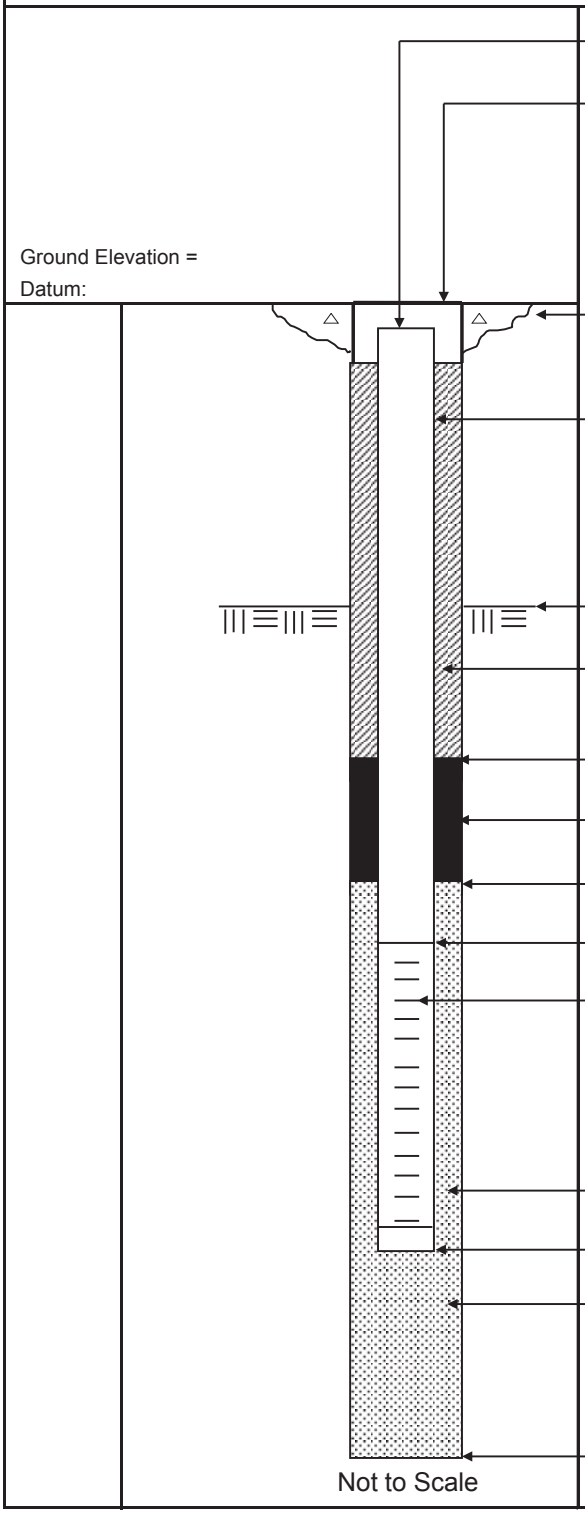
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0016
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/18/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

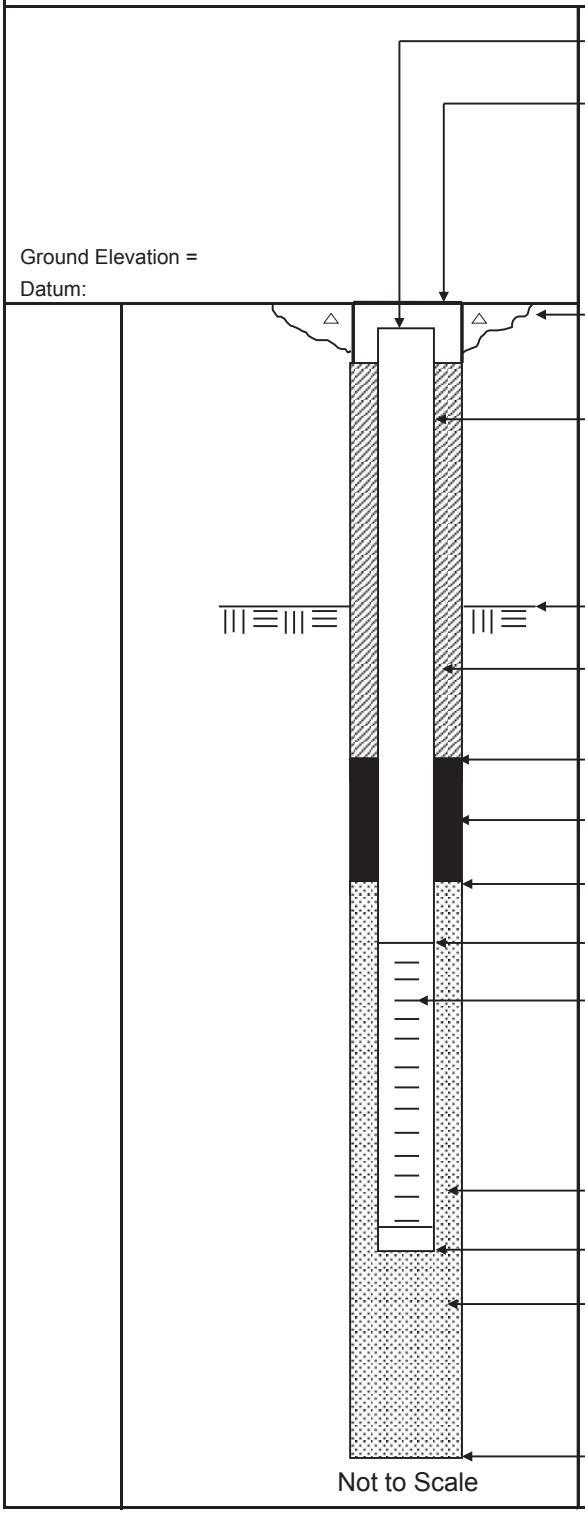
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0017
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/18/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

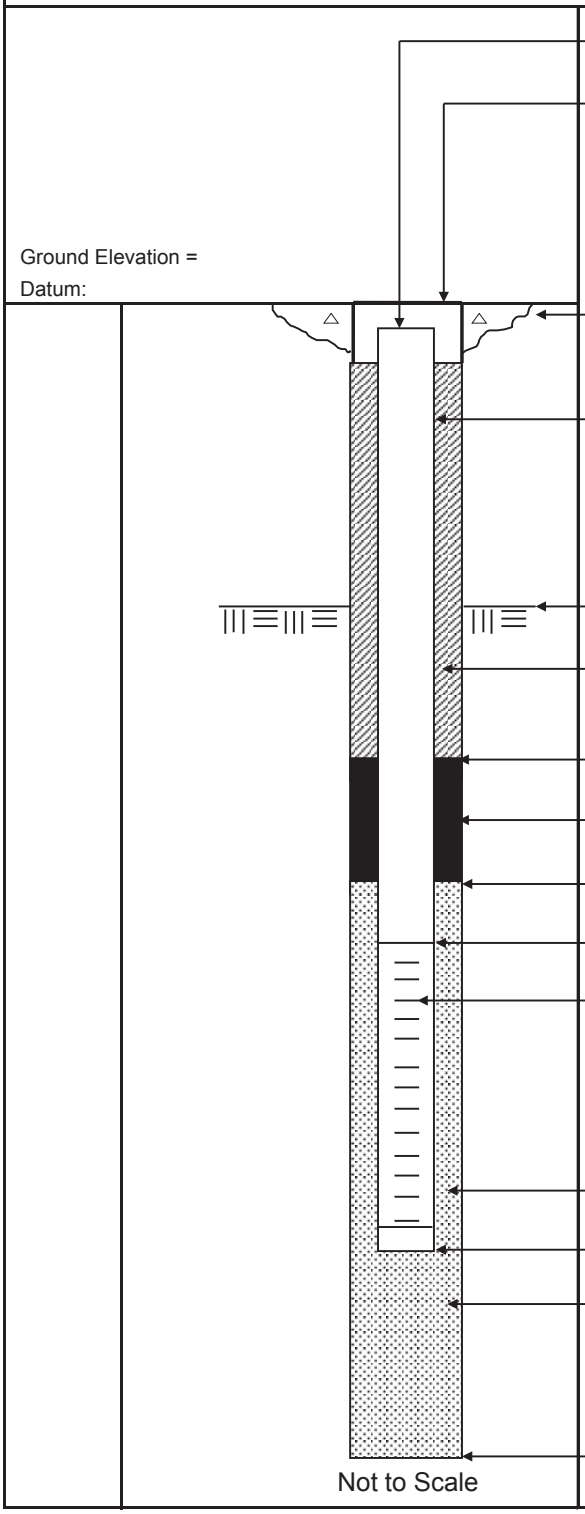
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0018
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/18/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

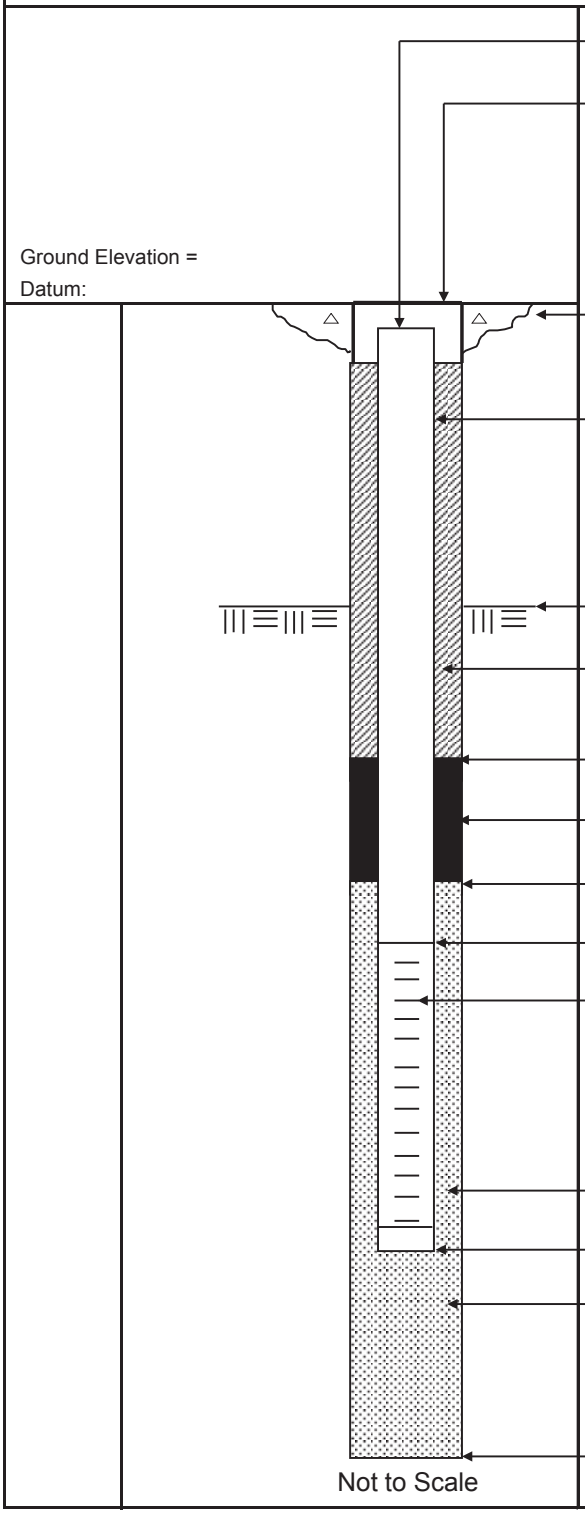
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0019
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/18/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

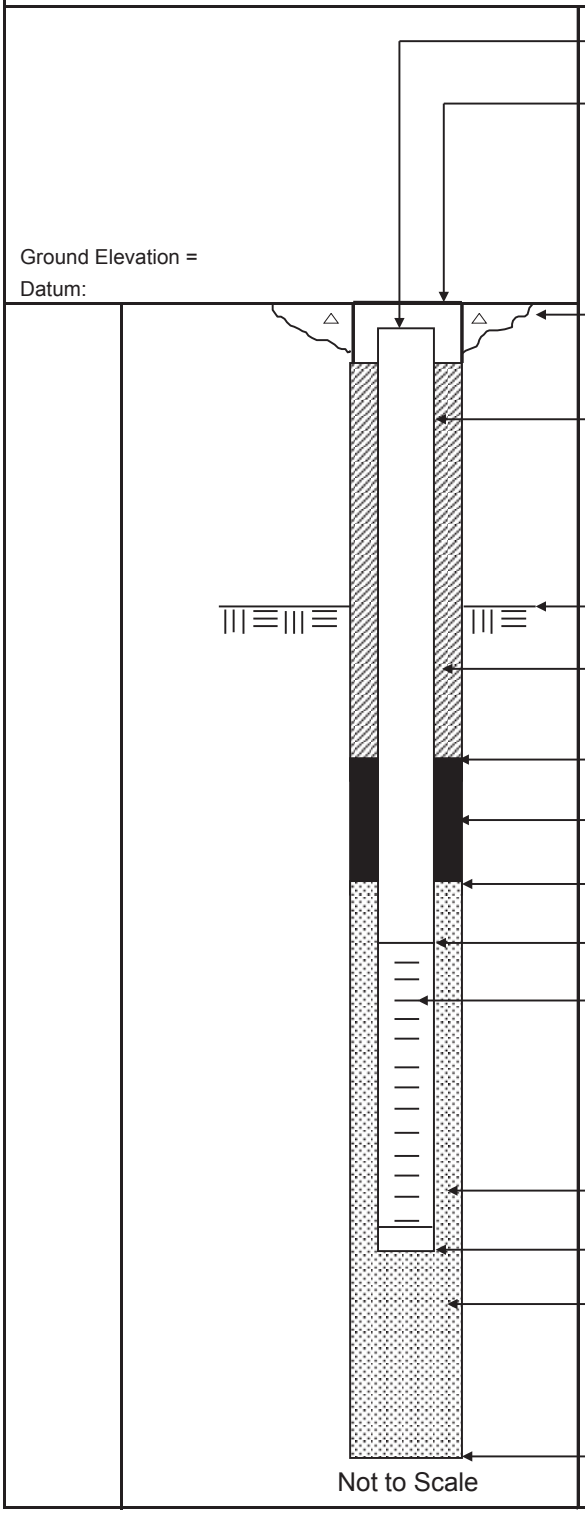
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0020
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

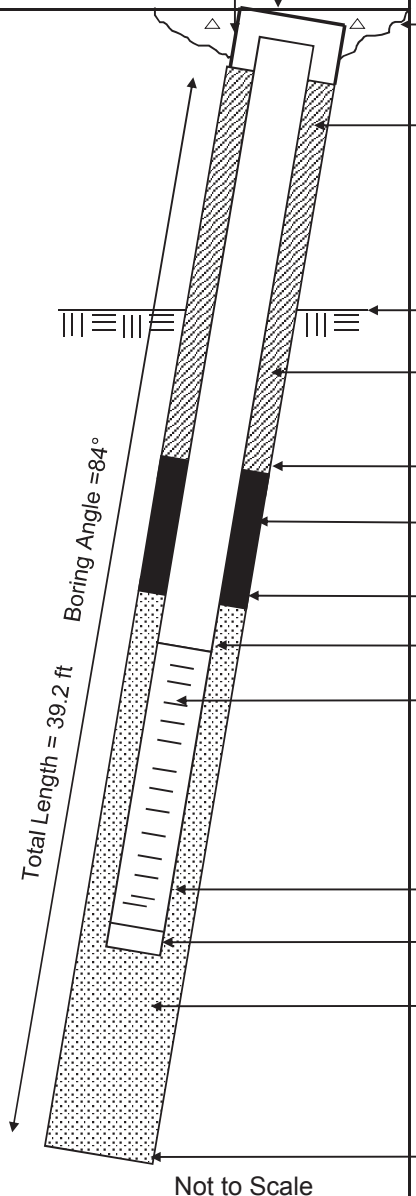
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 84 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0021
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/27/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 33.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 36.5

Elevation / Depth of Top of Diffuser: / 37.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 39.0

Elevation / Depth of Bottom of Filter Pack: / 39.0

Type of Backfill Below Well:

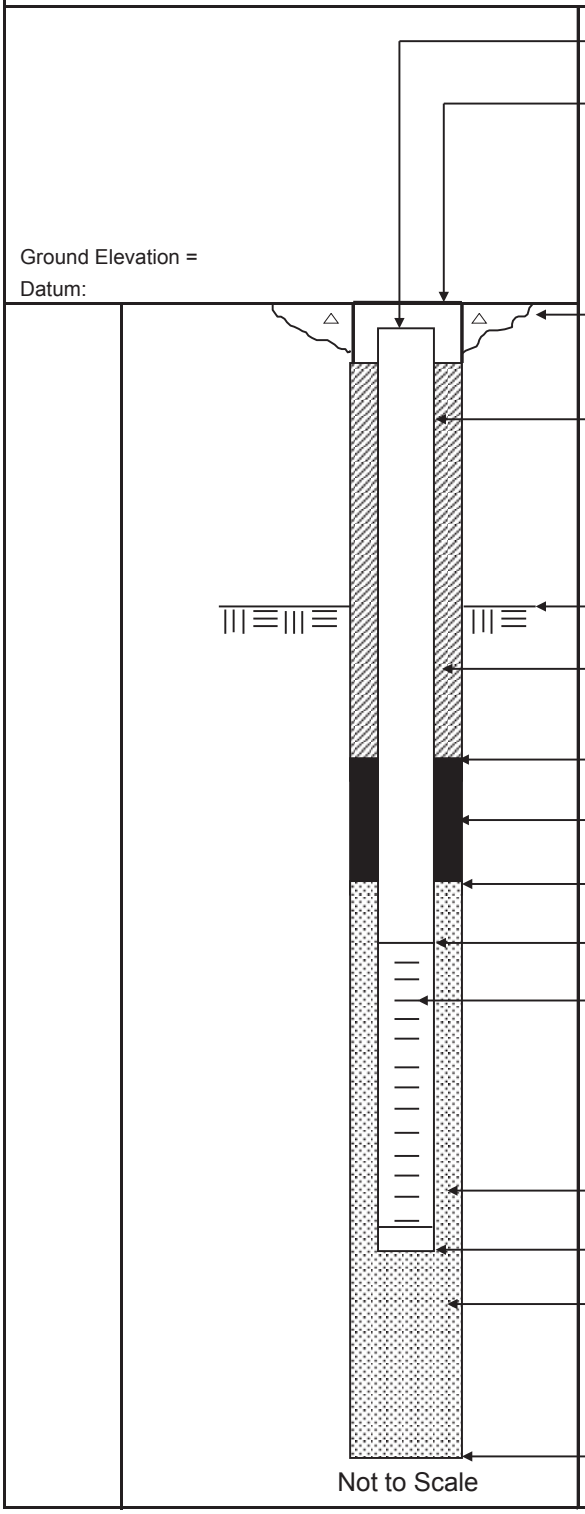
Elevation / Total Depth of Borehole: / 39.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0022
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/27/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

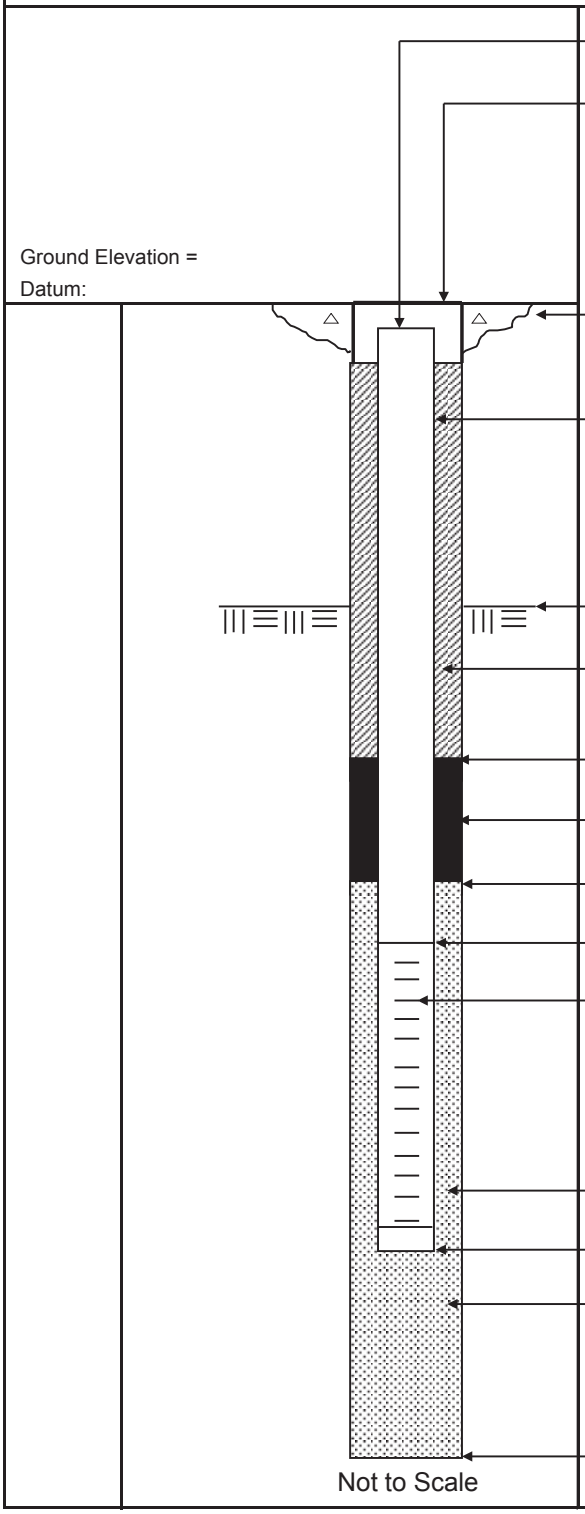
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0023
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/27/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

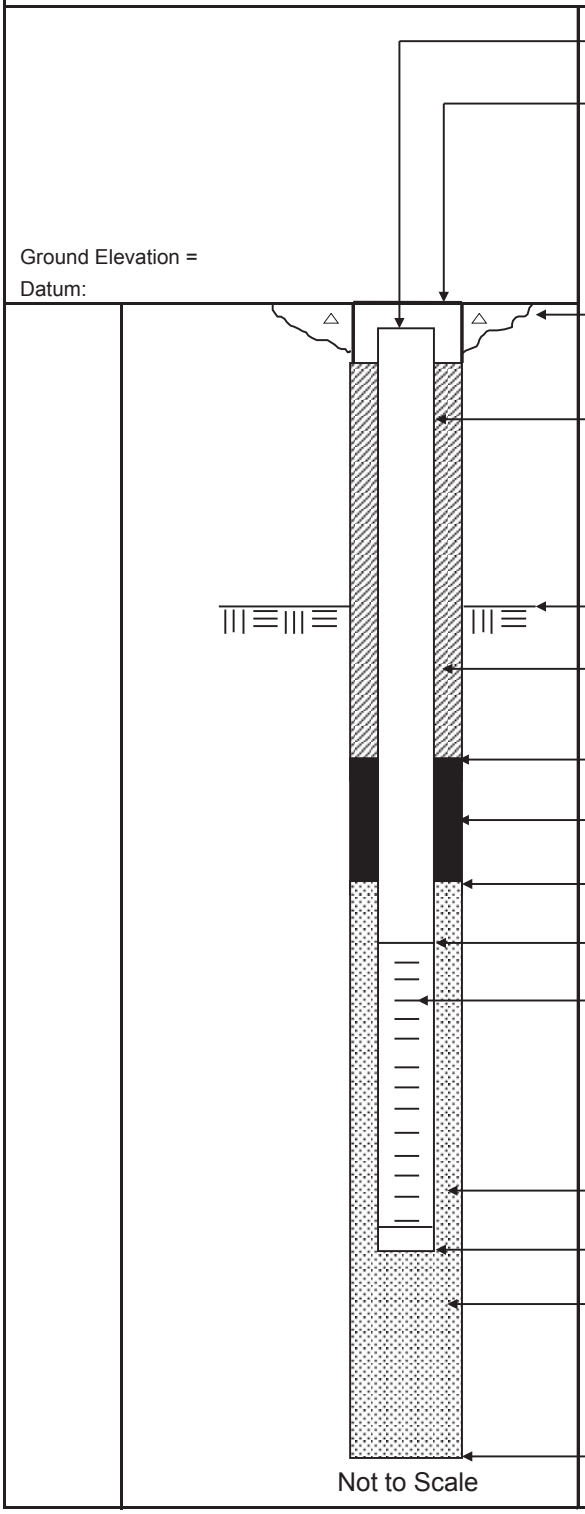
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0024
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/27/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

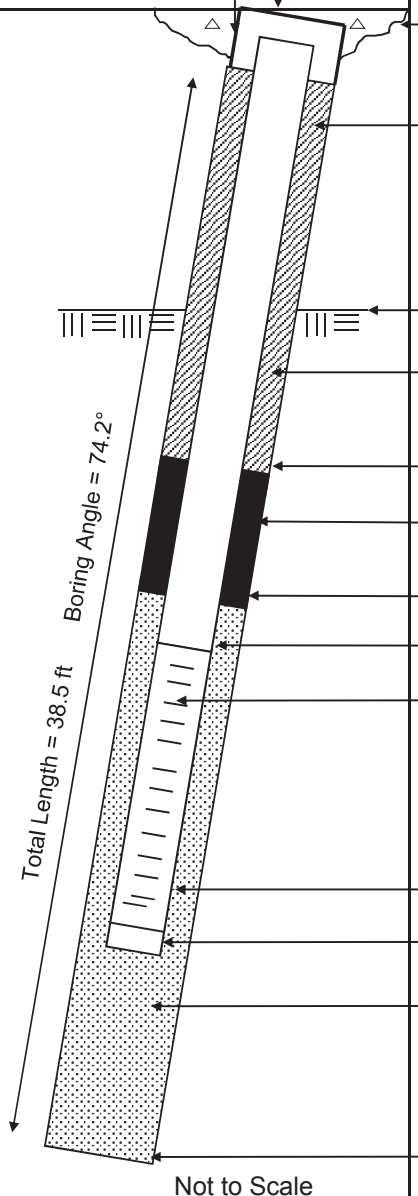
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 74.2 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0025
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/28/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

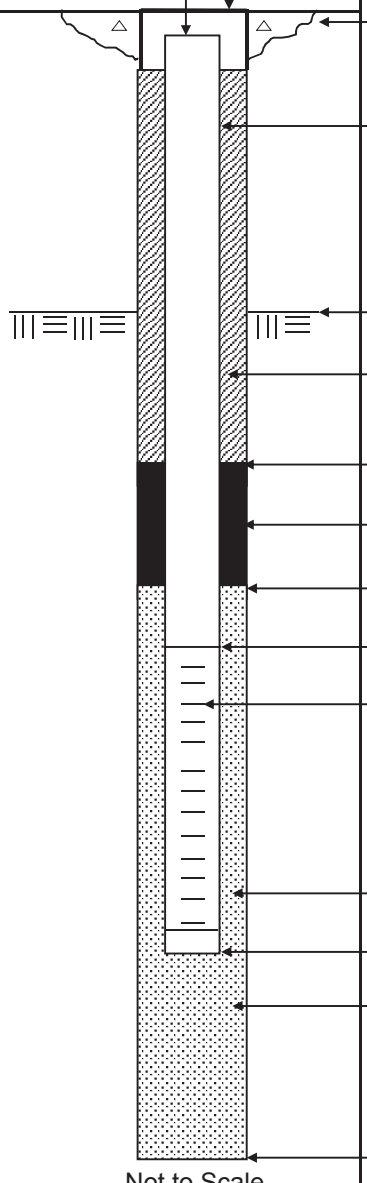
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0026
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/28/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal:

Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

Bentonite

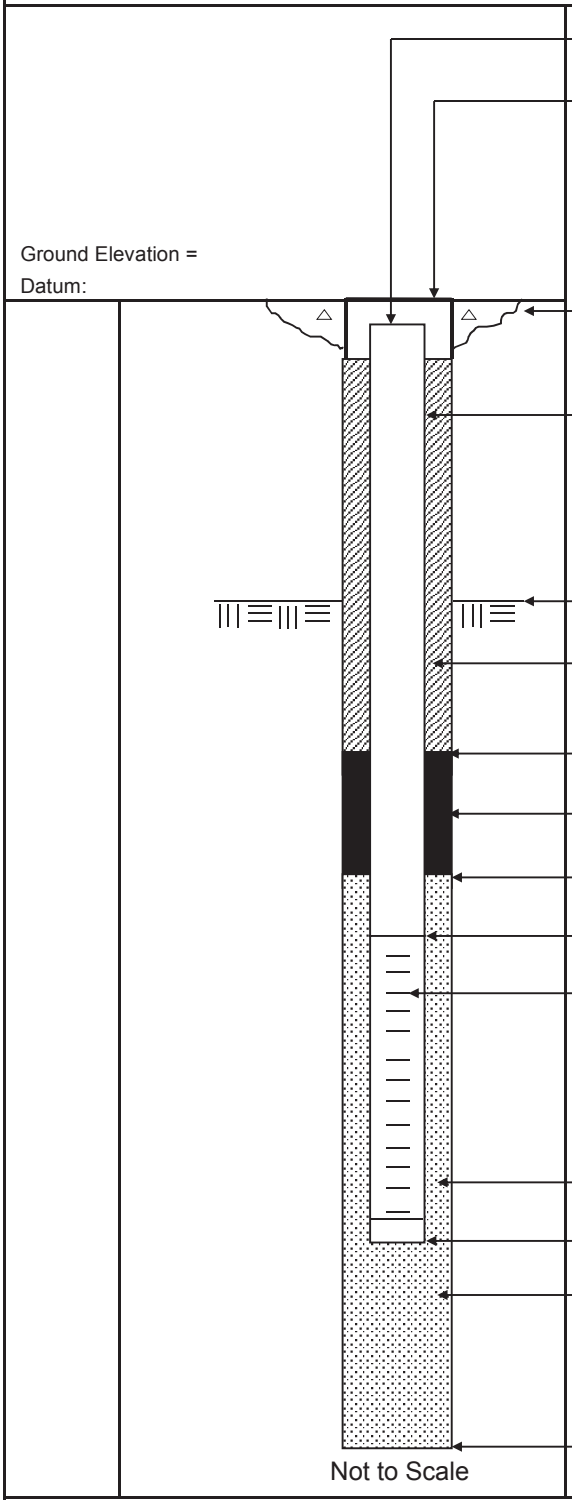
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0027
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/28/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal:

Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

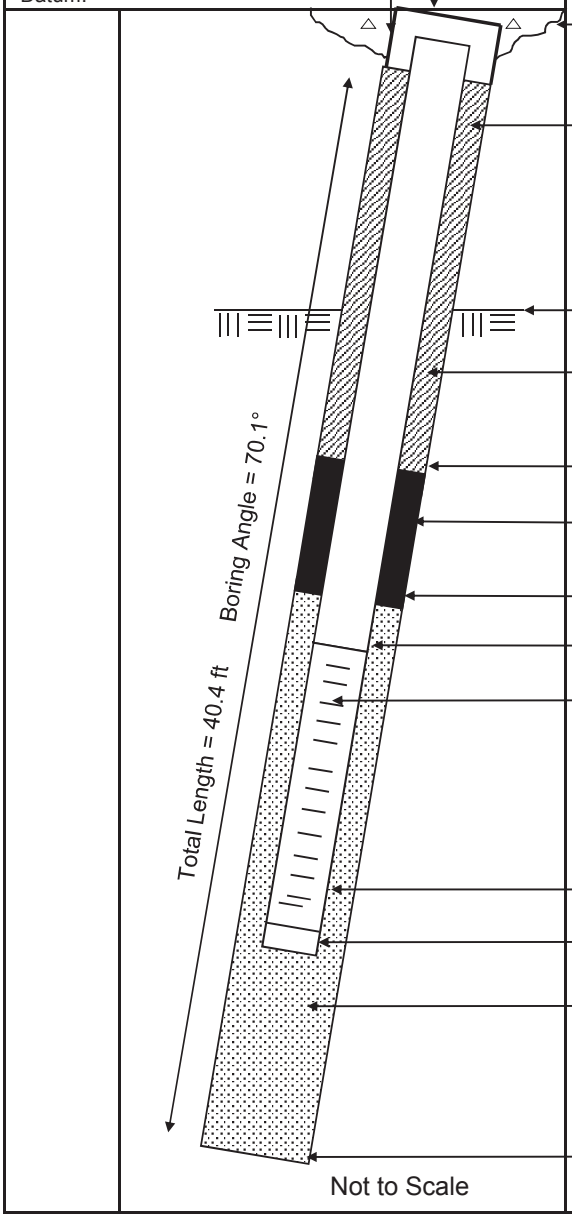
Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 70.1 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0028
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/27/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 32.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 35.5

Elevation / Depth of Top of Diffuser: / 36.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 38.0

Elevation / Depth of Bottom of Filter Pack: / 38.0

Type of Backfill Below Well:

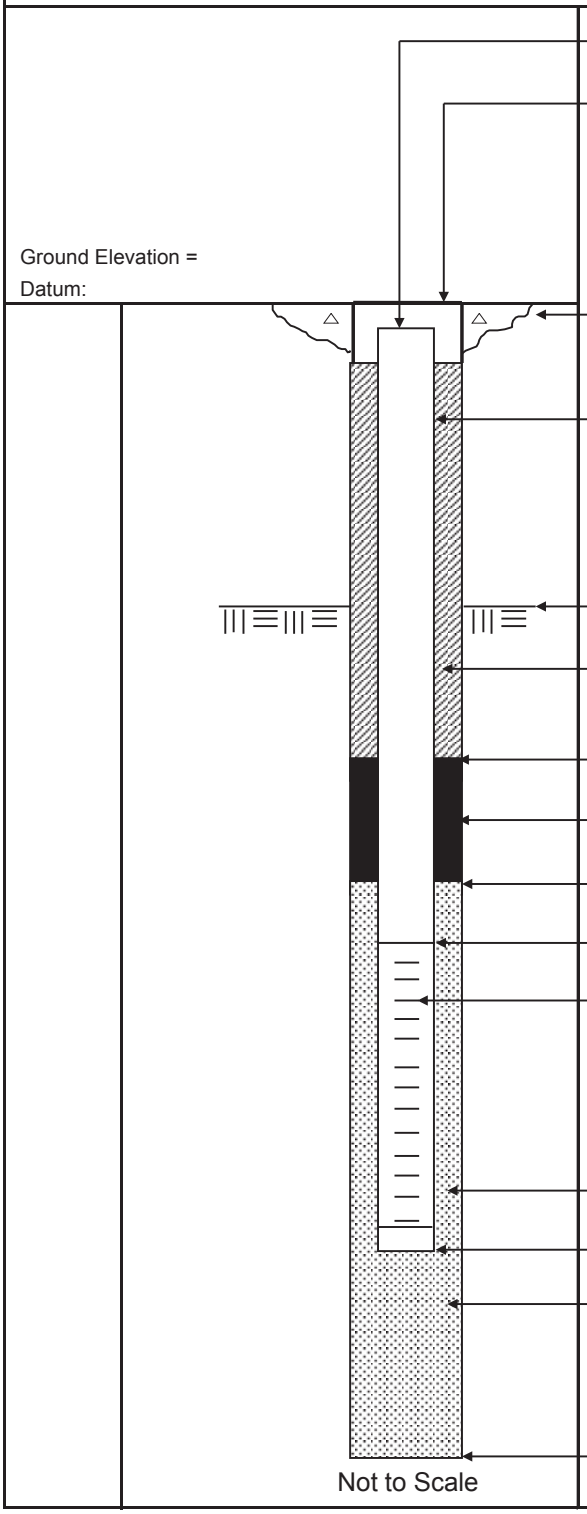
Elevation / Total Depth of Borehole: / 38.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0029
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/27/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 32.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 35.5

Elevation / Depth of Top of Diffuser: / 36.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 38.0

Elevation / Depth of Bottom of Filter Pack: / 38.0

Type of Backfill Below Well: Bentonite

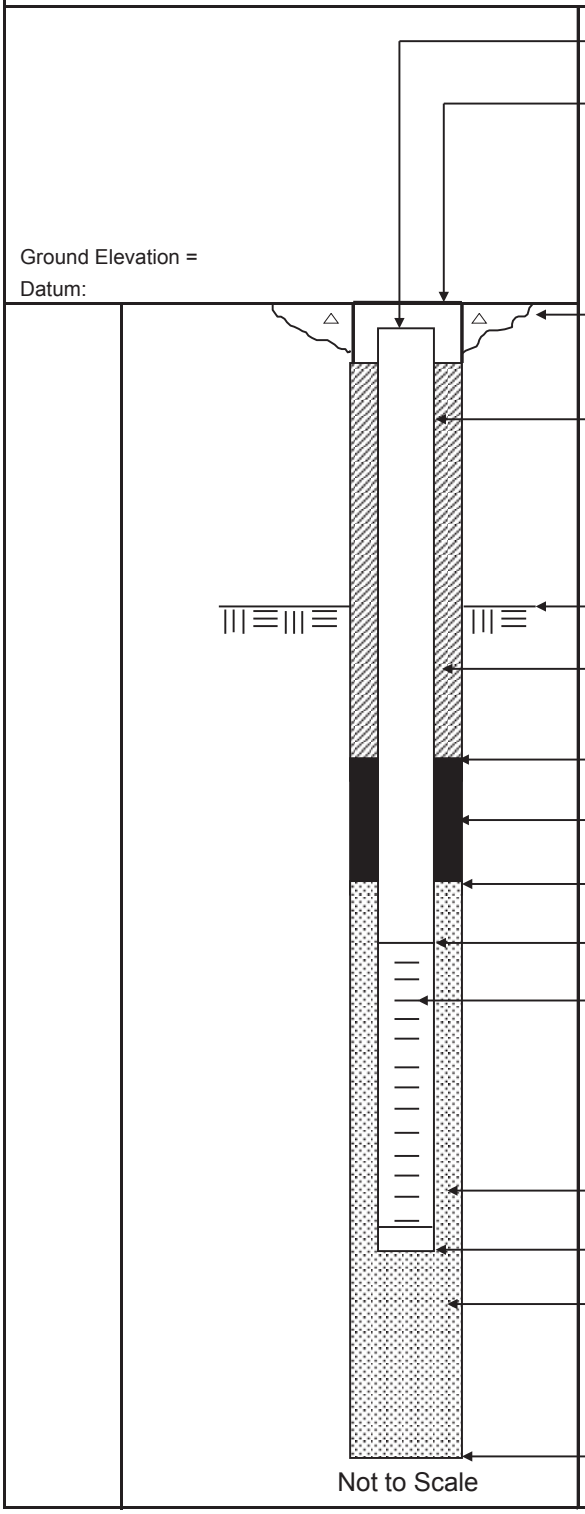
Elevation / Total Depth of Borehole: / 38.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0030
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/26/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

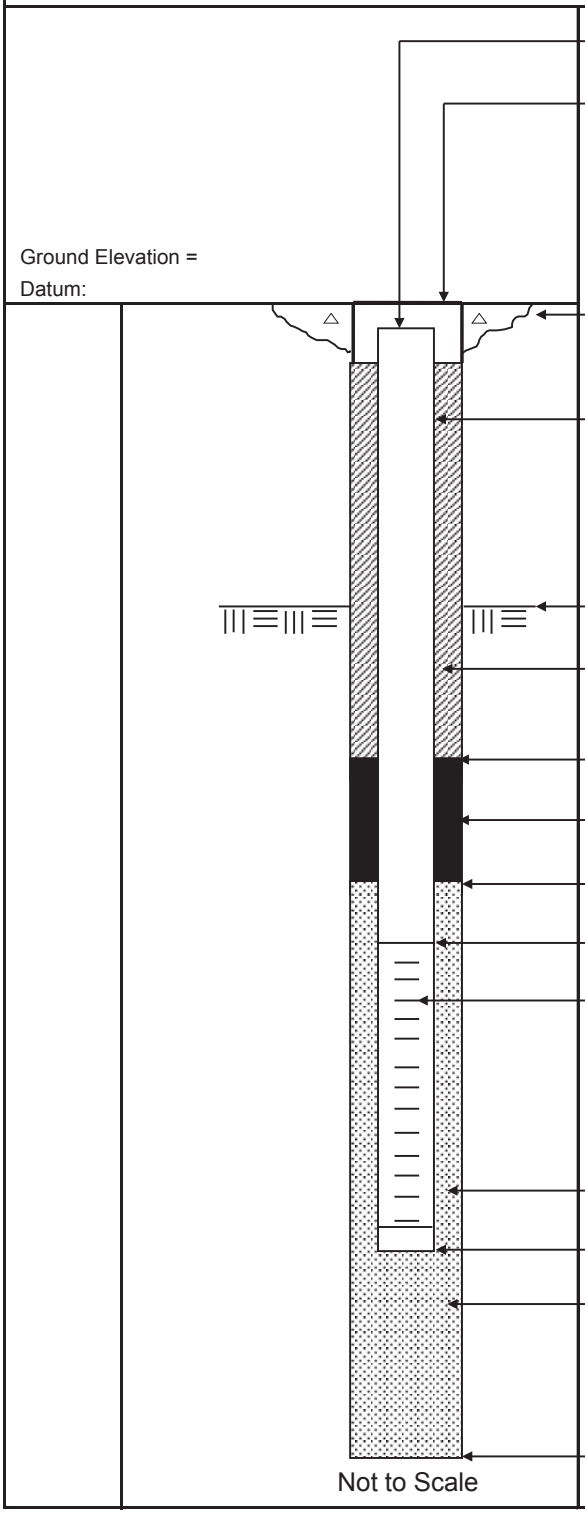
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0031
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/26/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

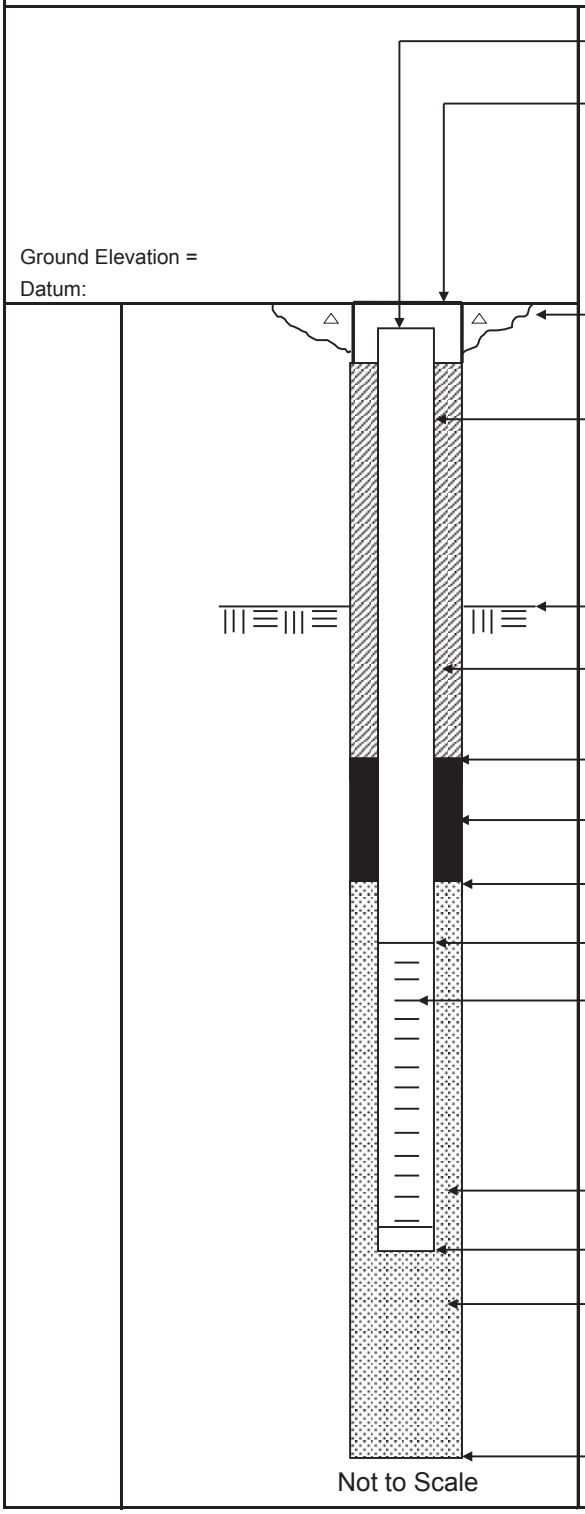
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0032
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/26/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

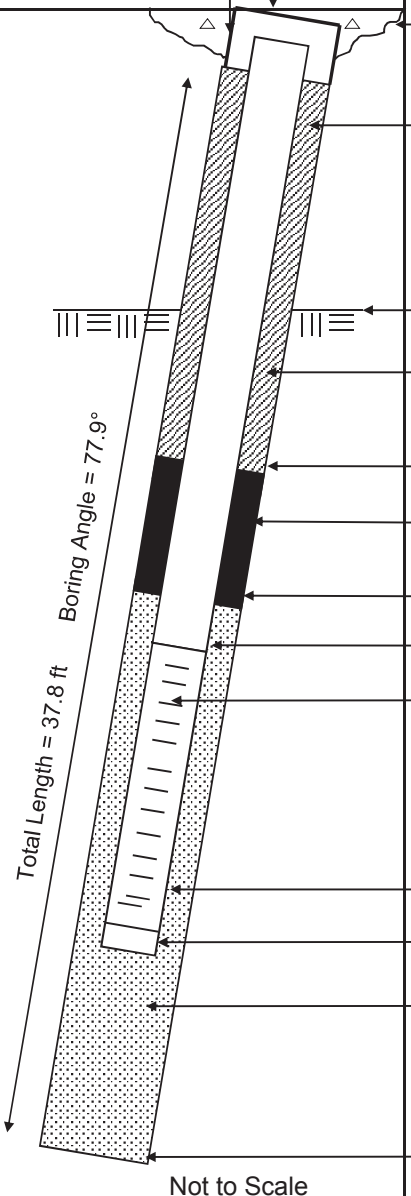
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 77.9 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0033
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/25/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

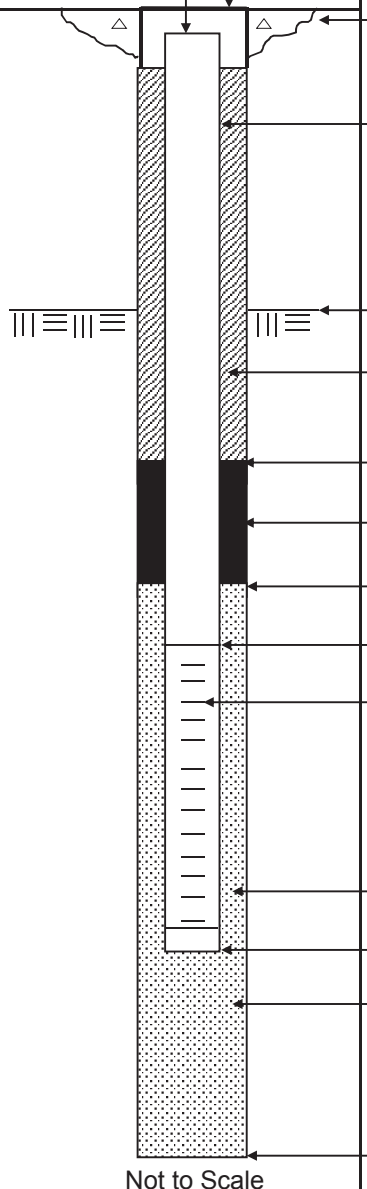
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0034
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/28/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal:

Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

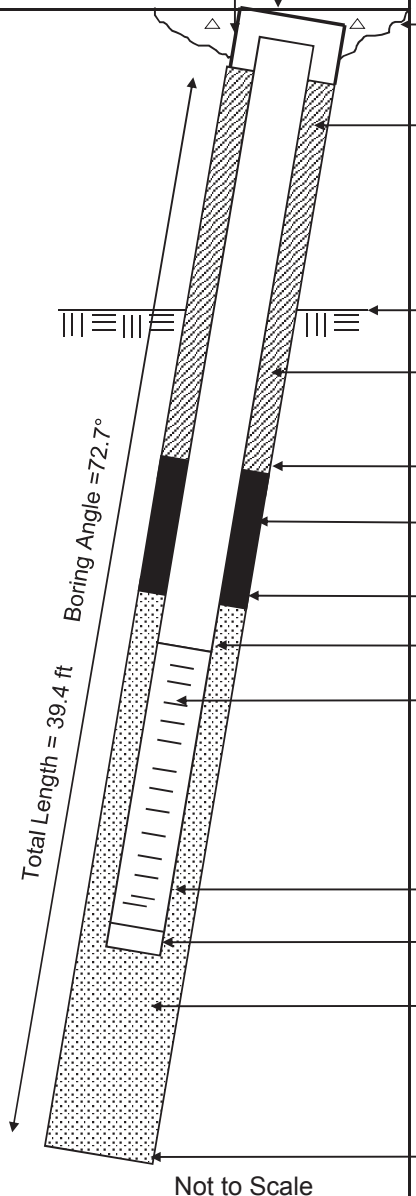
Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 72.7 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0035
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/26/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	

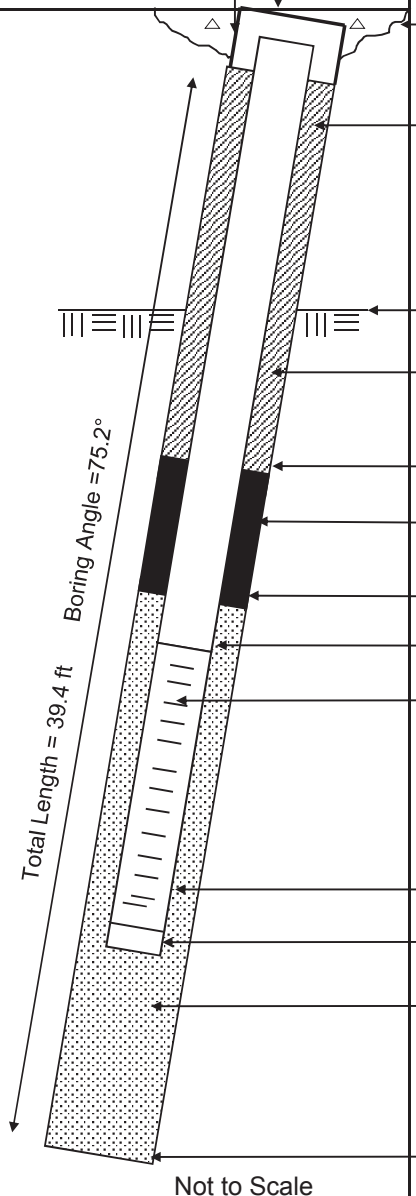


Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/ 0
I.D. of Surface Casing:		
Type of Surface Casing:		
Type of Surface Seal:		
Cement		
I.D. of Riser:	1"	
Type of Riser:	PVC	
Borehole Diameter:	4 Inch	
casing to foot depth		
Elevation / Depth Top of Rock:		/ NA
Type of Seal:	Portland	
Cement Grout		
Elevation / Depth of Seal:		/ 32.5
Type of Seal:	Bentonite	
Elevation / Depth of Top of Filter Pack:		/ 35.5
Elevation / Depth of Top of Diffuser:		/ 36.0
Type of Diffuser:	Schumasoil	
Slot Size x Length:	1" x 20" x 50 Micron	
I.D. of Diffuser:	1"	
Type of Filter Pack:	20/30 Filter Sand	
Elevation / Depth of Bottom of Diffuser:		/ 38.0
Elevation / Depth of Bottom of Filter Pack:		/ 38.0
Type of Backfill Below Well:		
Elevation / Total Depth of Borehole:		/ 38.0

Tetra Tech, Inc. Angle 75.2 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0036
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/26/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 32.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 35.5

Elevation / Depth of Top of Diffuser: / 36.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 38.0

Elevation / Depth of Bottom of Filter Pack: / 38.0

Type of Backfill Below Well:

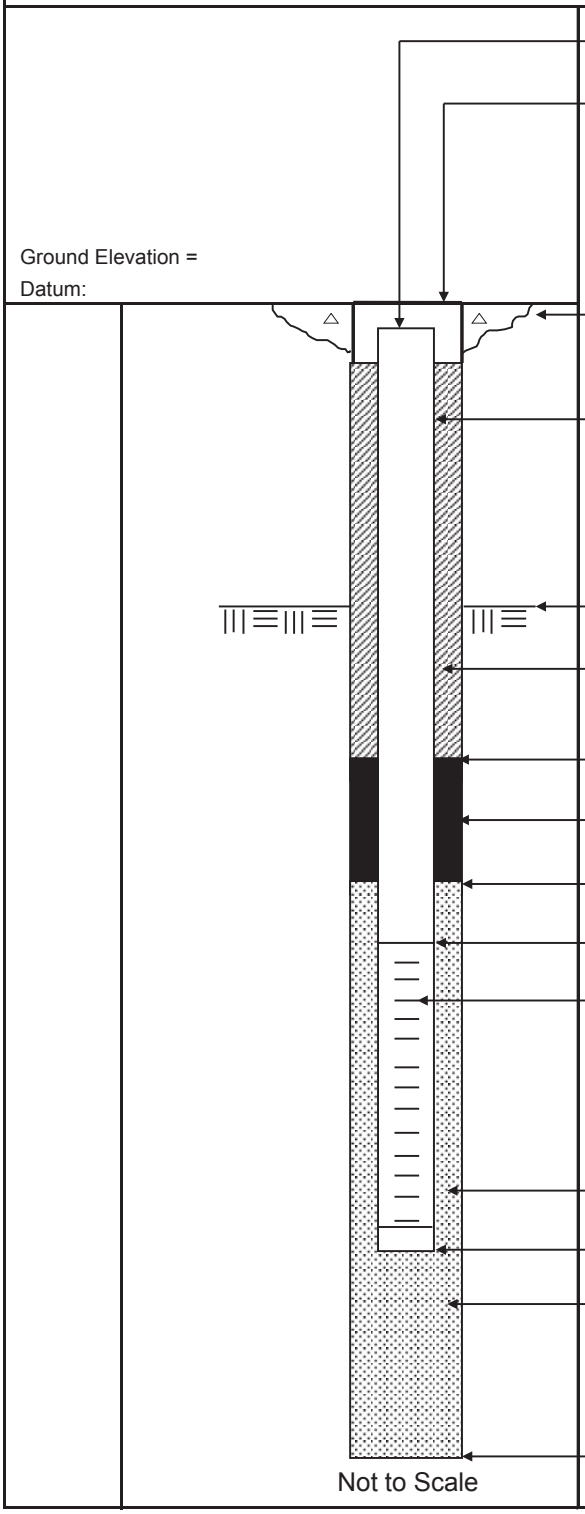
Elevation / Total Depth of Borehole: / 38.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0037
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/25/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

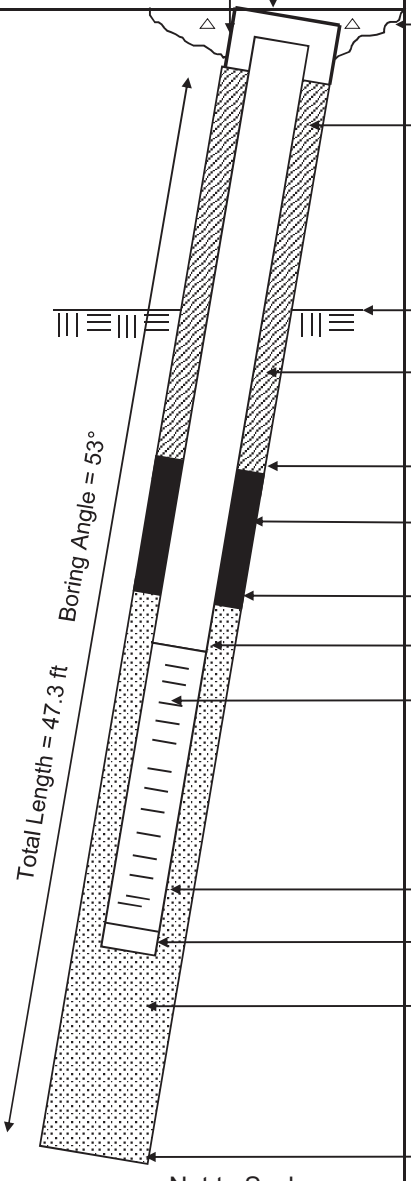
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 53 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0038
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/28/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal:
Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland
Cement Grout

Elevation / Depth of Seal: / 32.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 35.5

Elevation / Depth of Top of Diffuser: / 36.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 38.0

Elevation / Depth of Bottom of Filter Pack: / 38.0

Type of Backfill Below Well:

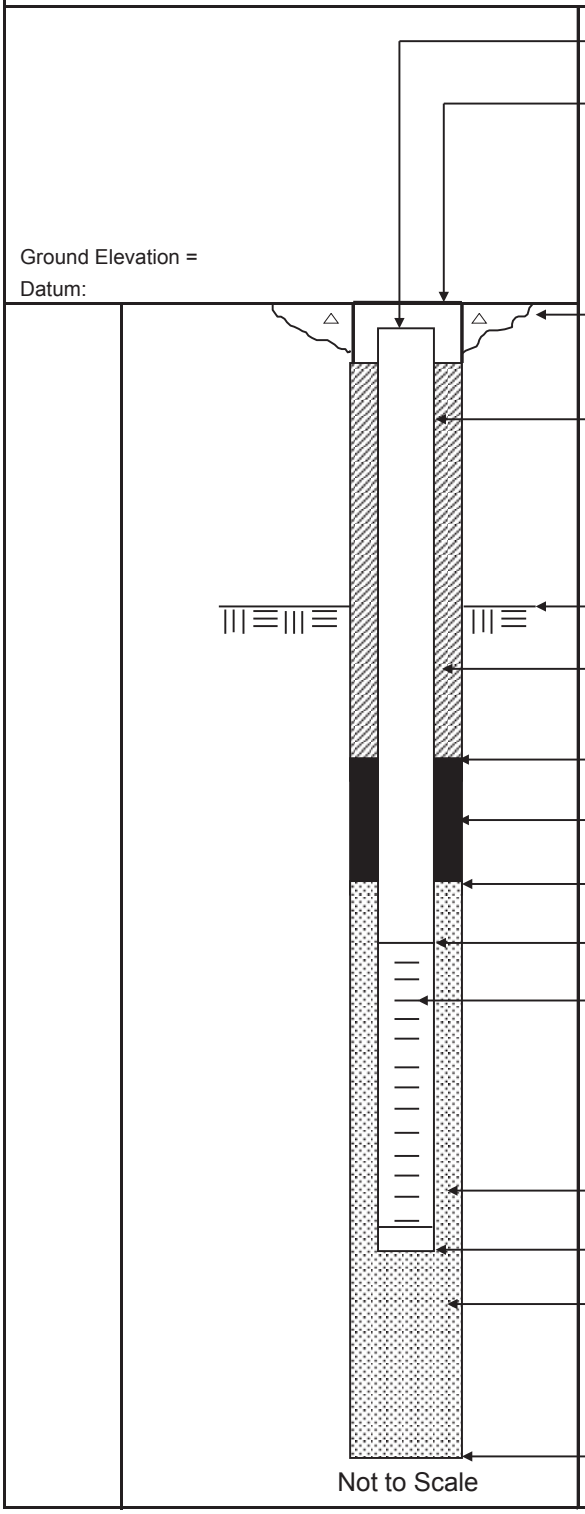
Elevation / Total Depth of Borehole: / 38.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0039
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/22/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

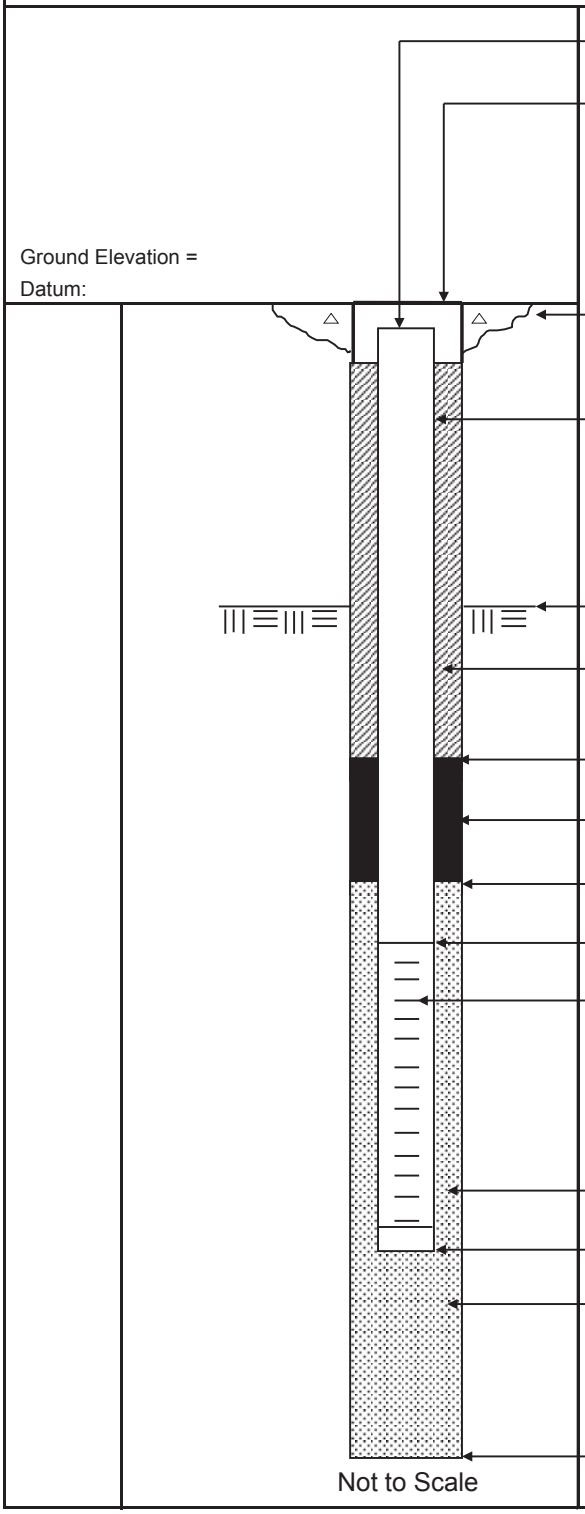
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0040
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/22/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

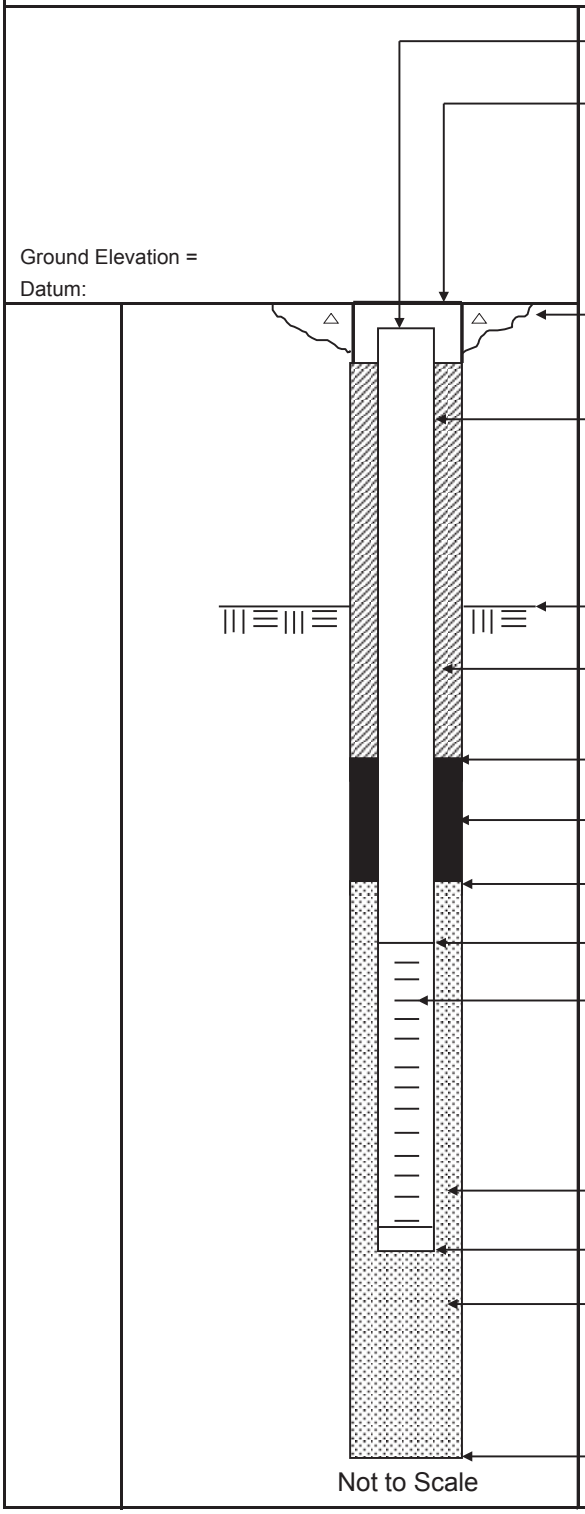
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0041
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/22/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

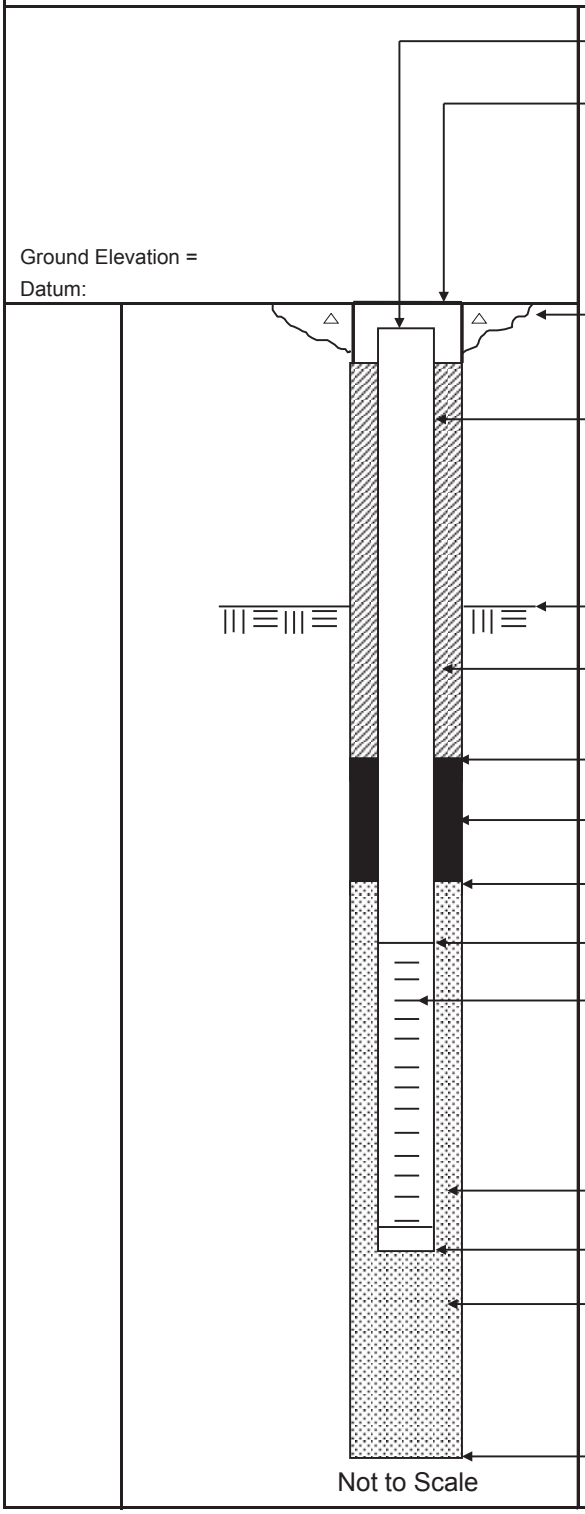
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0042
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

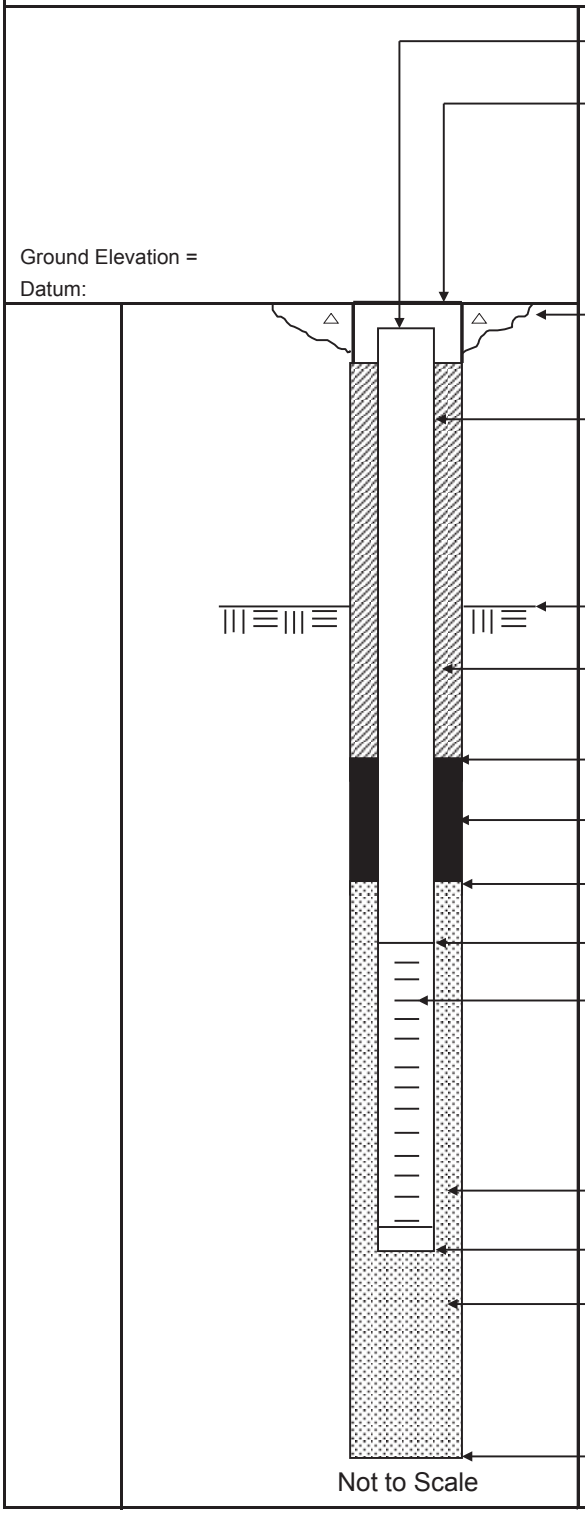
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0043
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

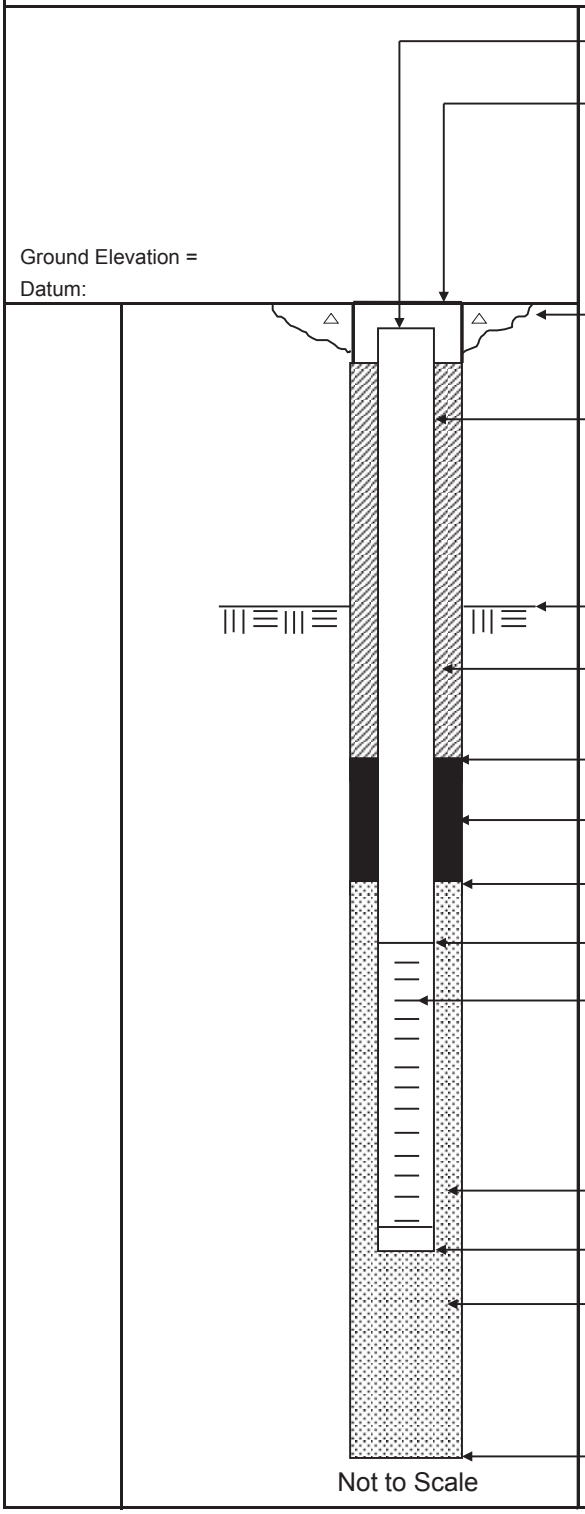
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0044
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

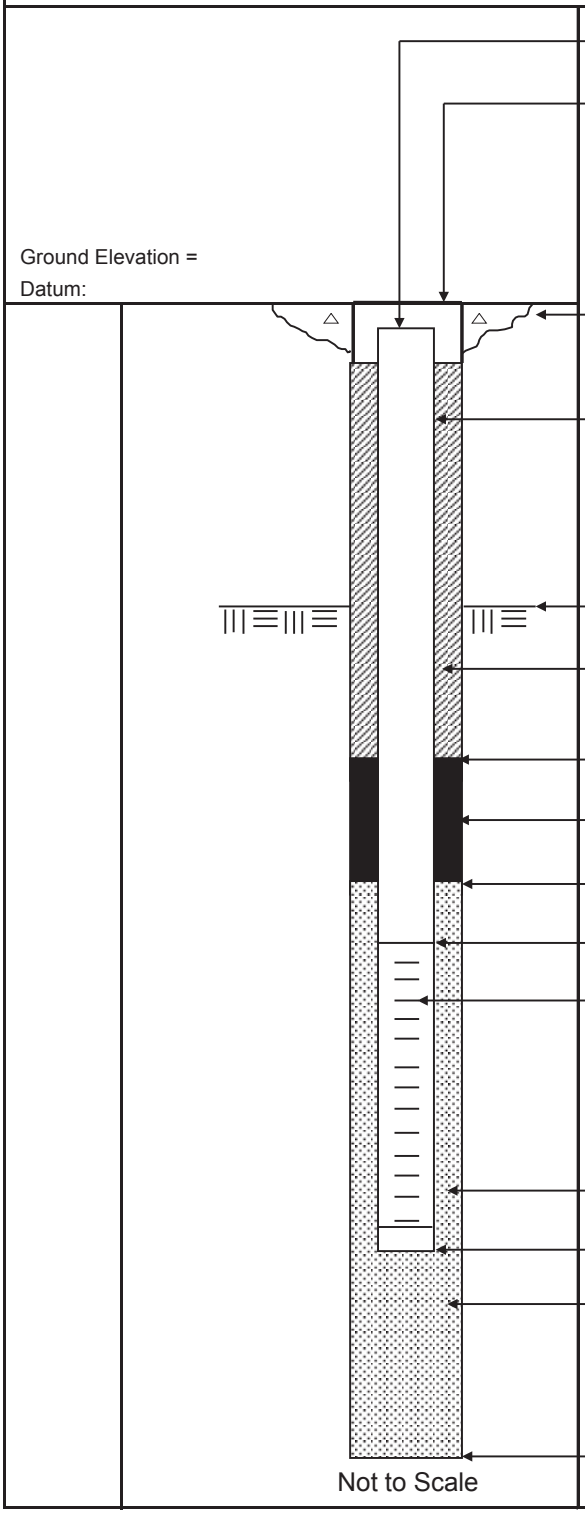
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0045
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

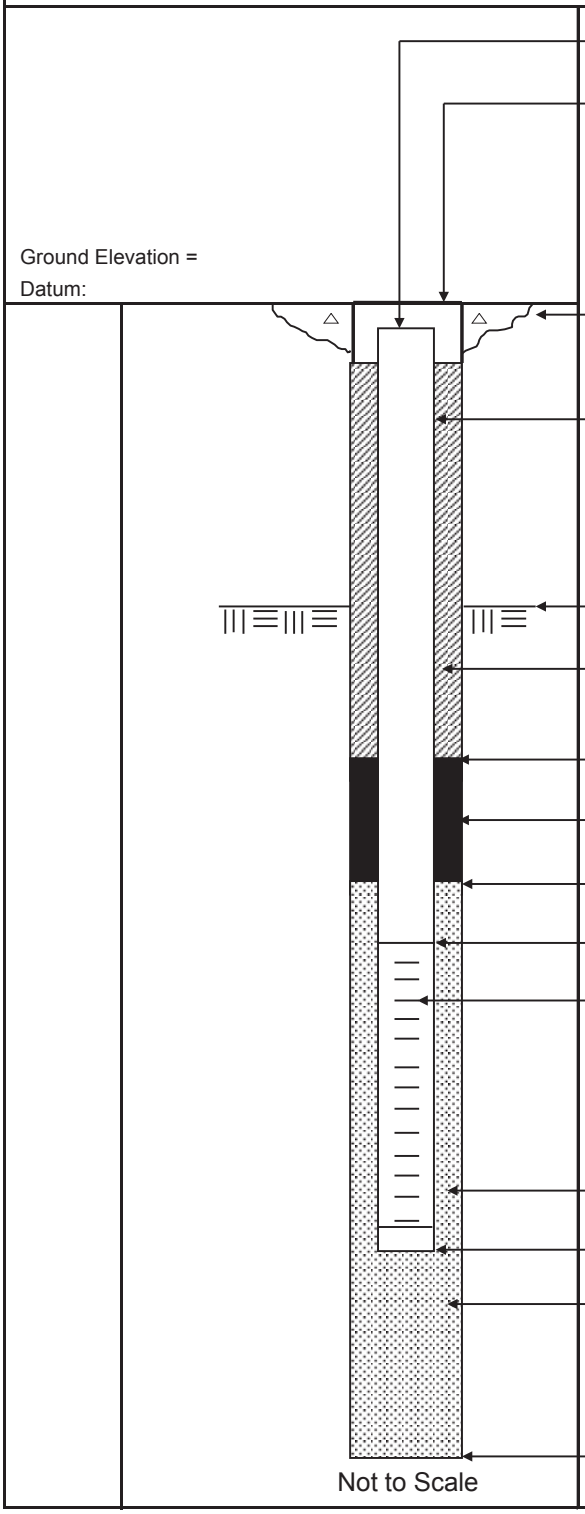
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0046
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

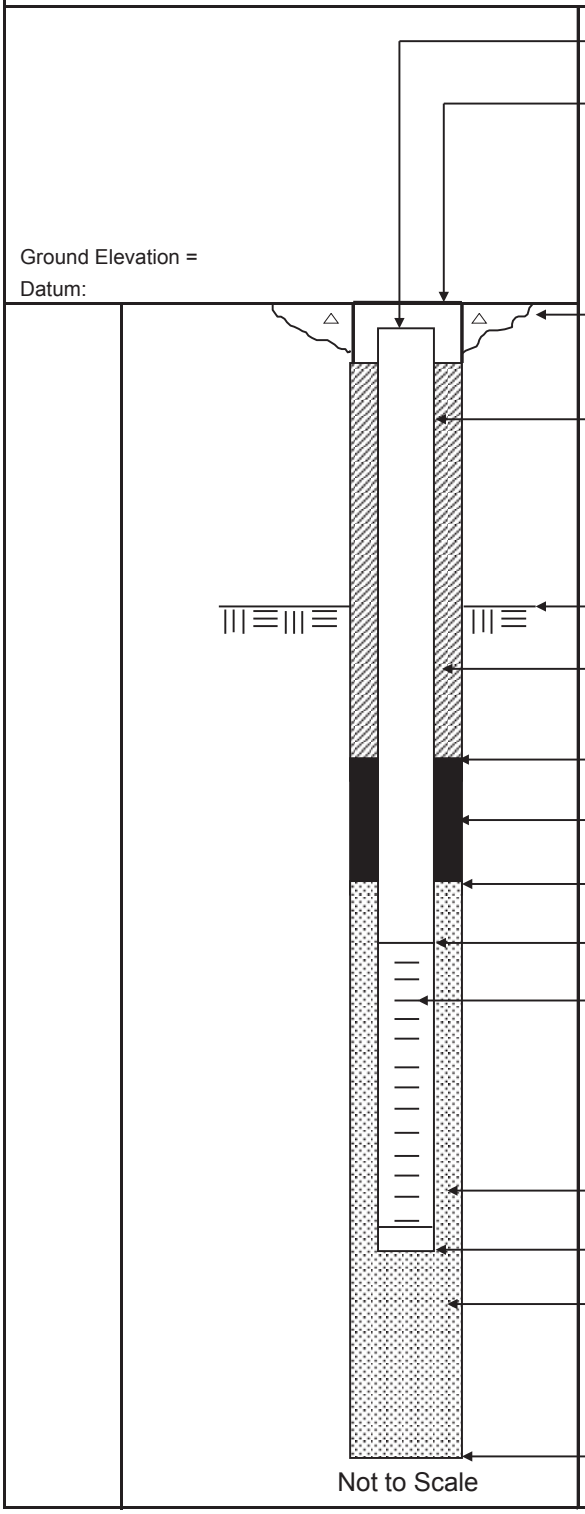
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0047
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

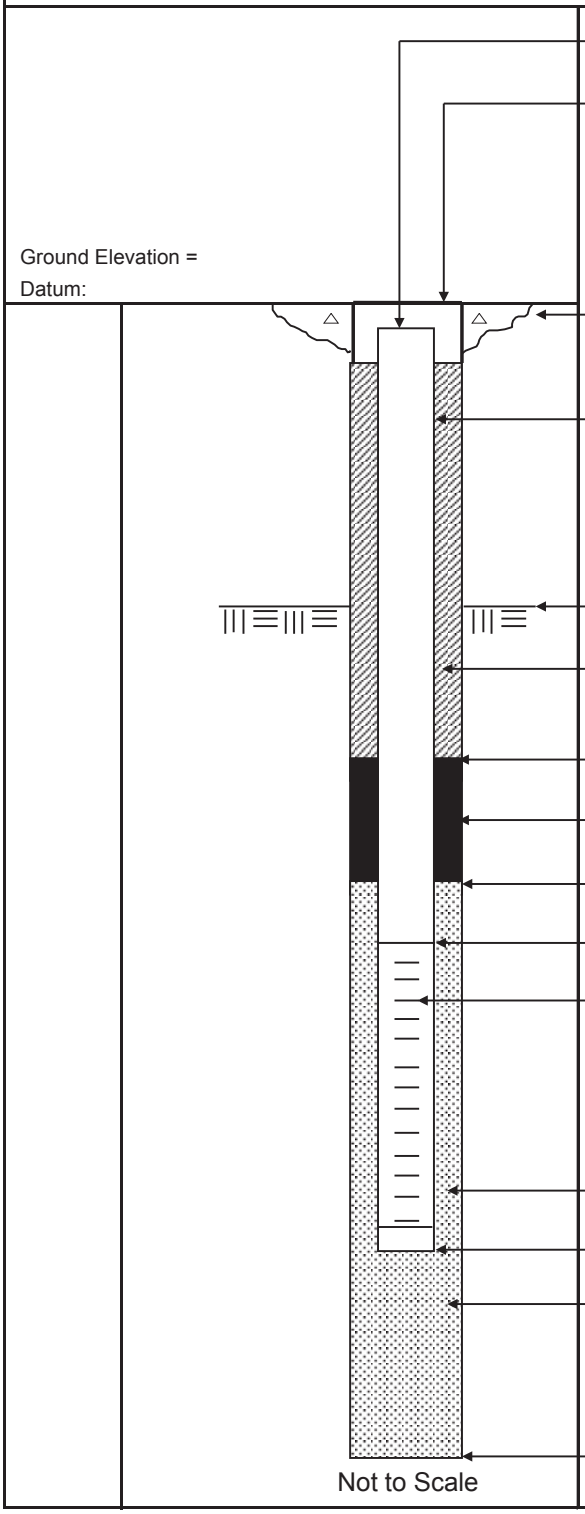
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0048
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

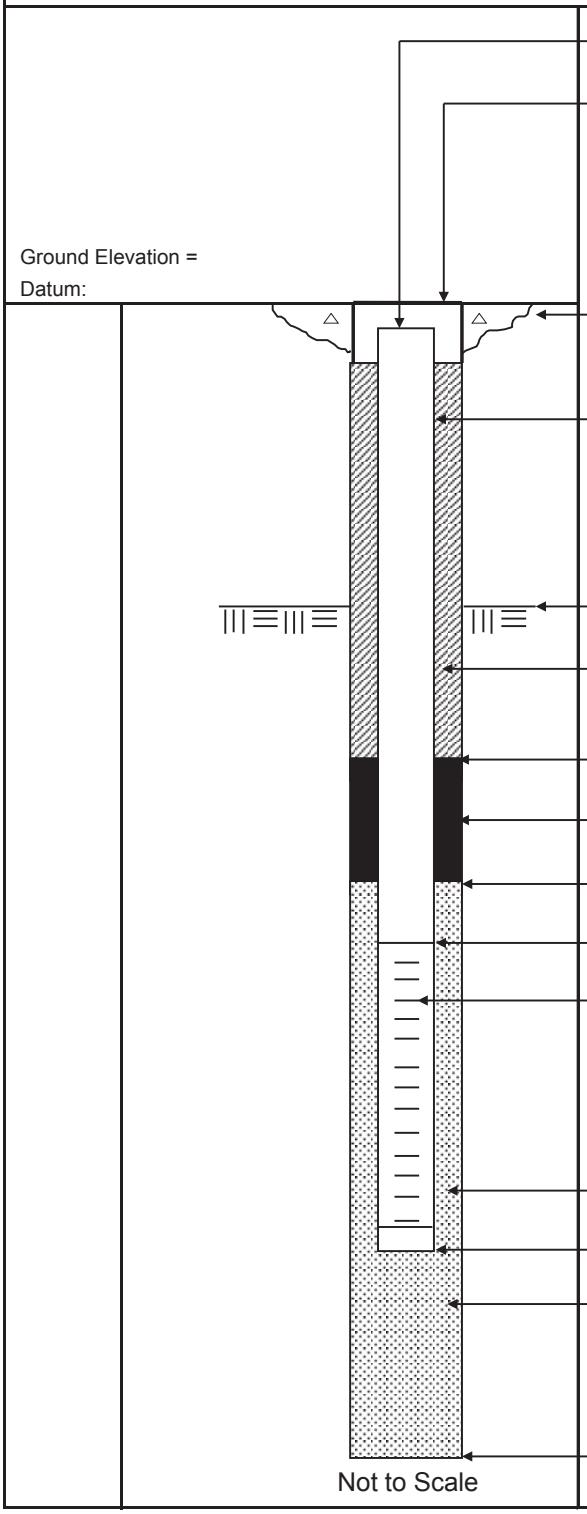
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0049
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

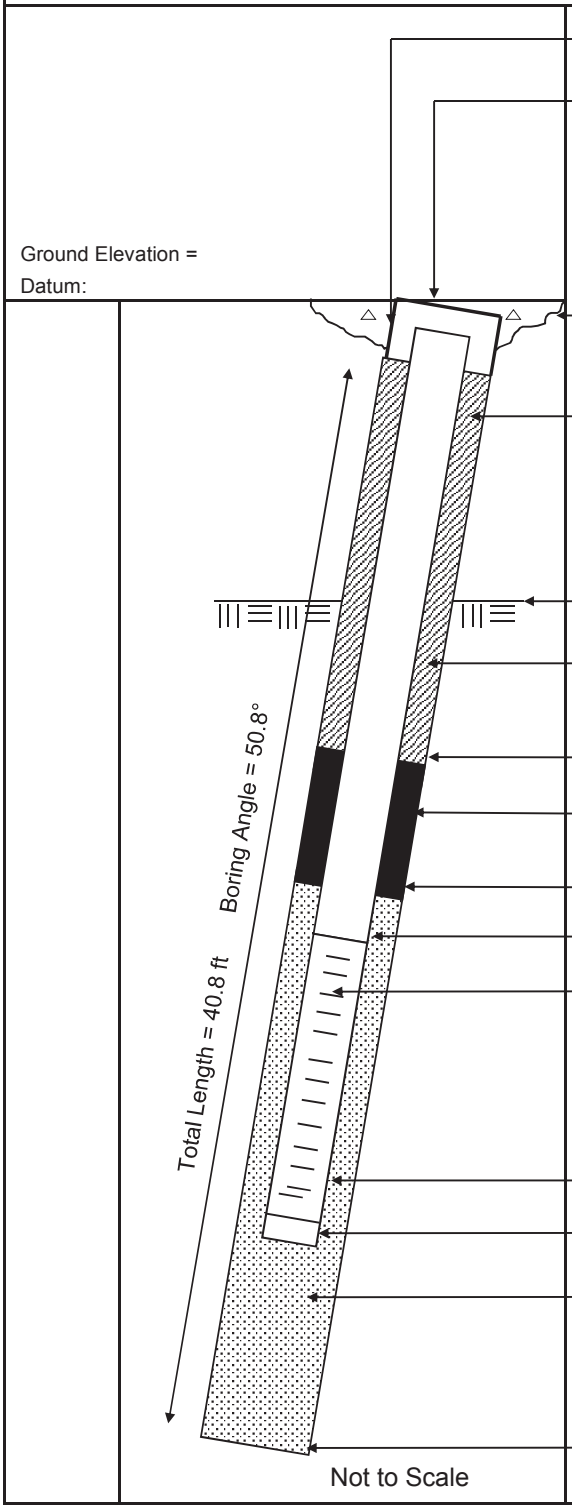
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 50.8 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0050
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 26.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 29.5

Elevation / Depth of Top of Diffuser: / 30.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 32.0

Elevation / Depth of Bottom of Filter Pack: / 32.0

Type of Backfill Below Well:

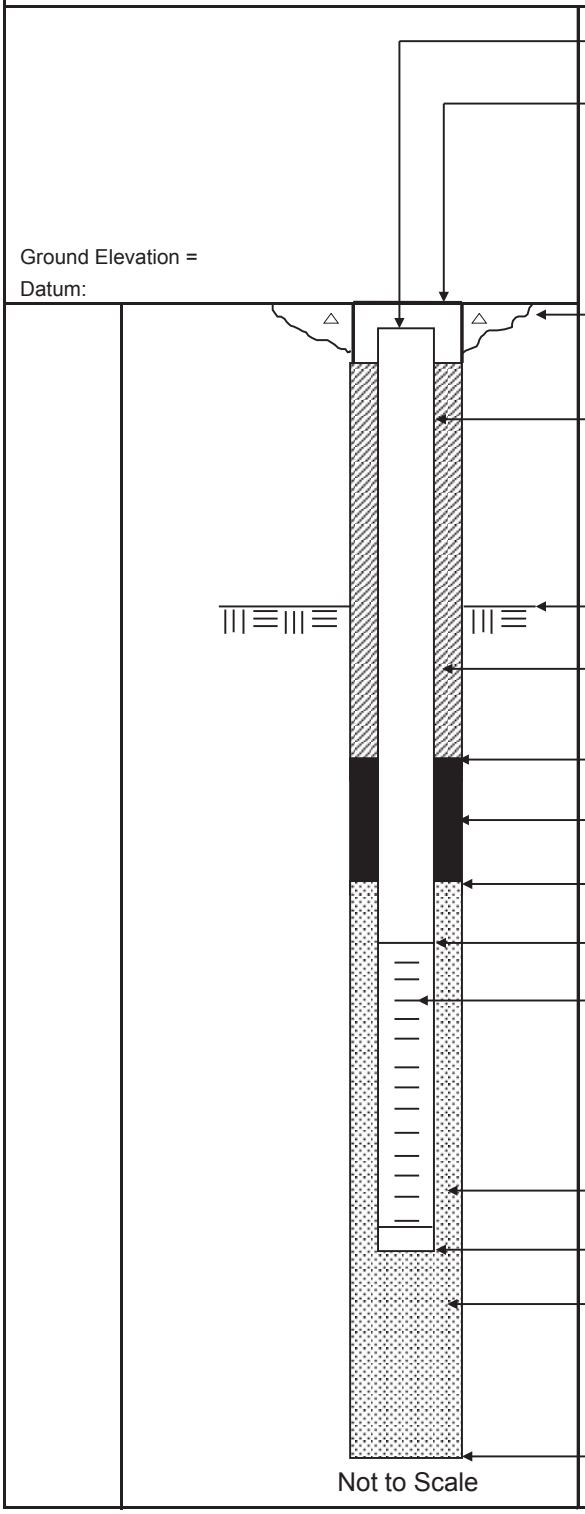
Elevation / Total Depth of Borehole: / 32.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0051
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

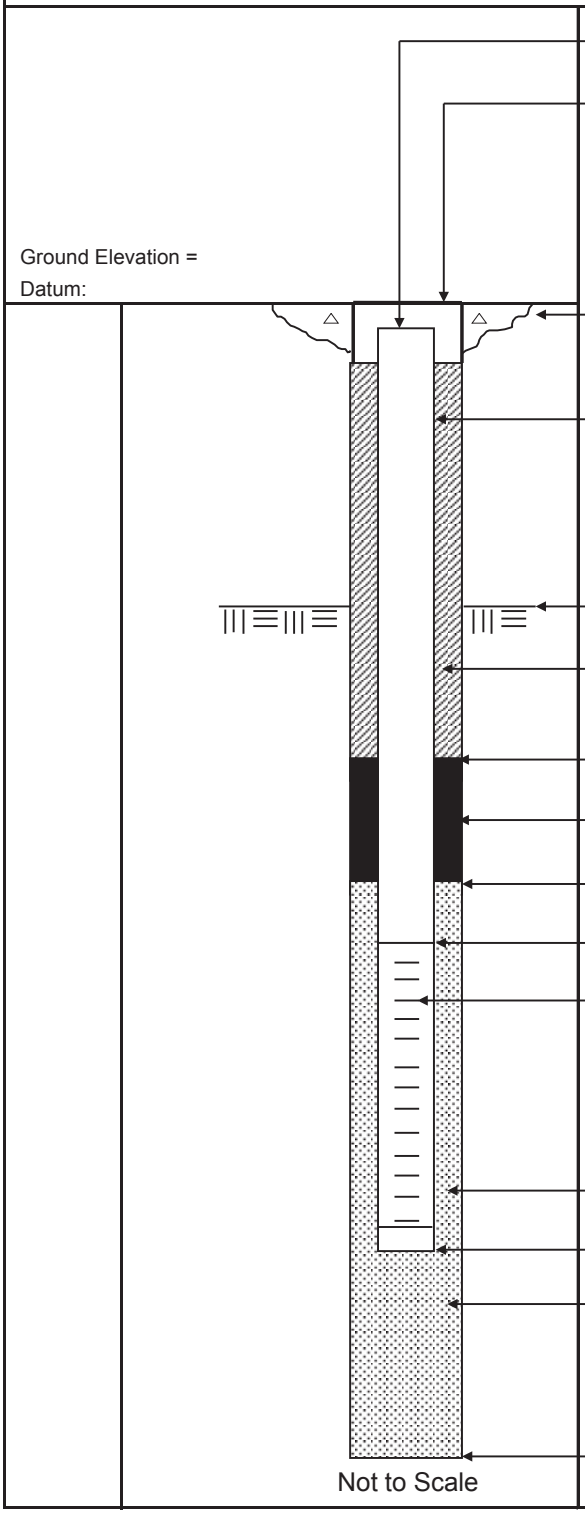
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0052
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

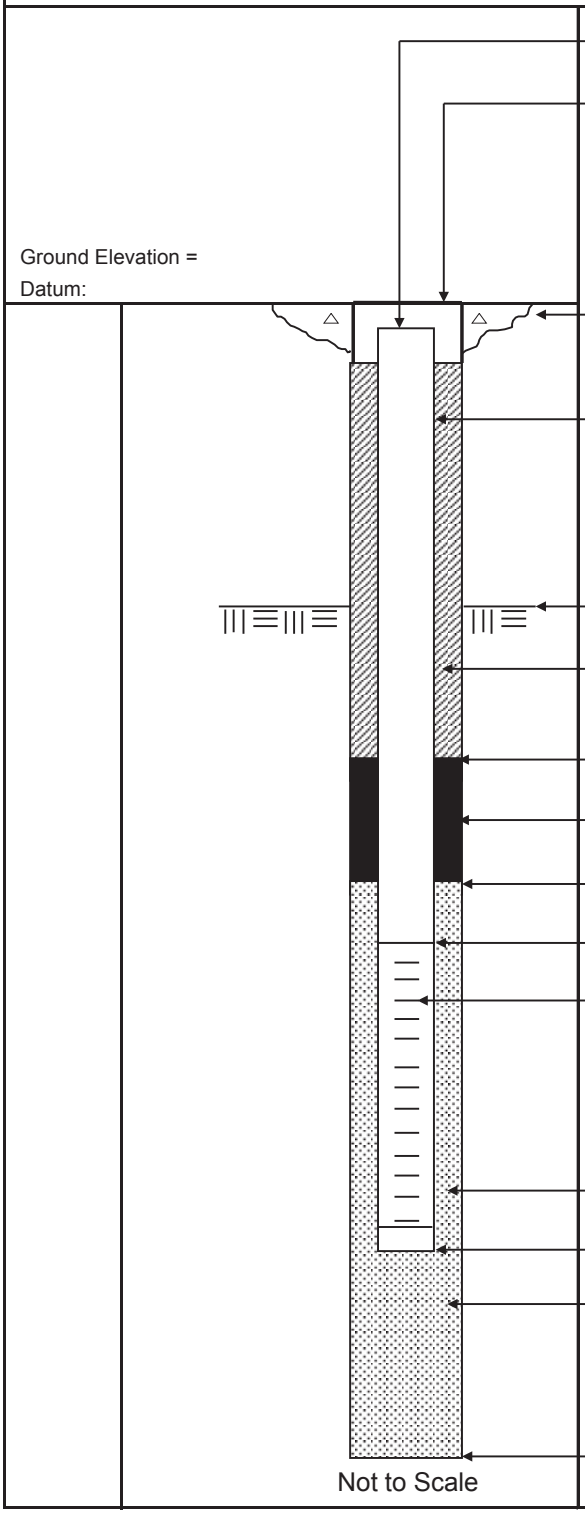
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0053
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

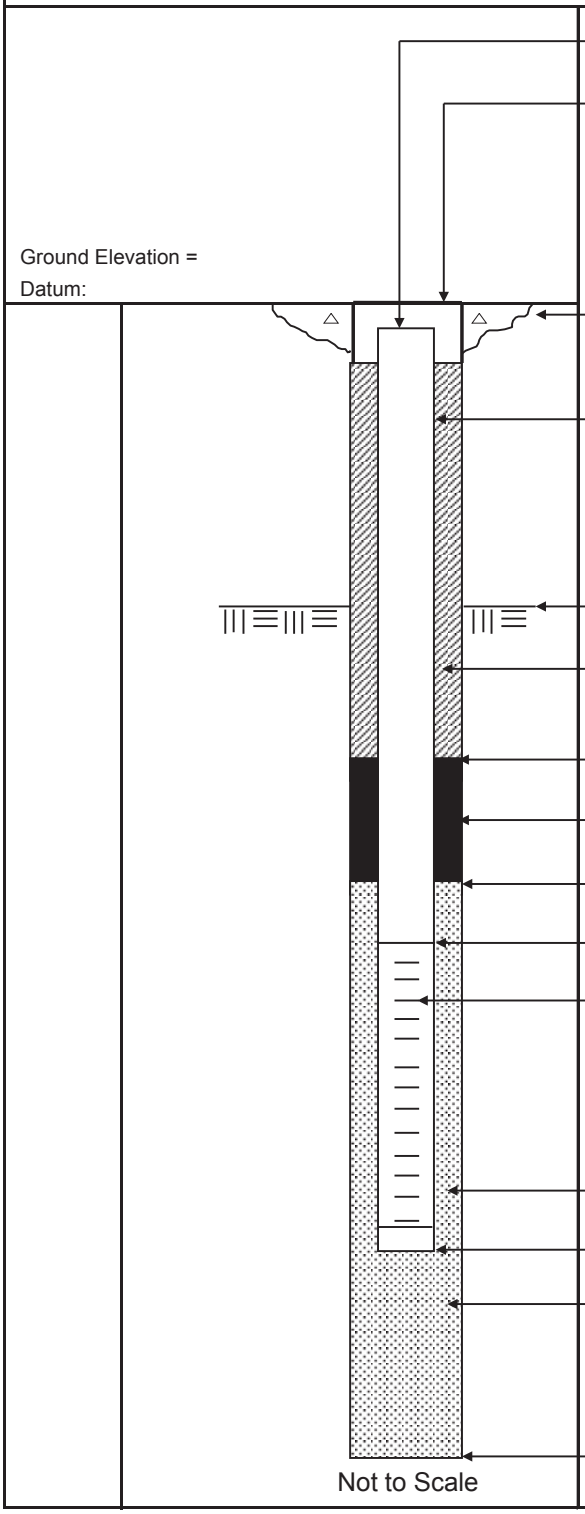
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0054
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

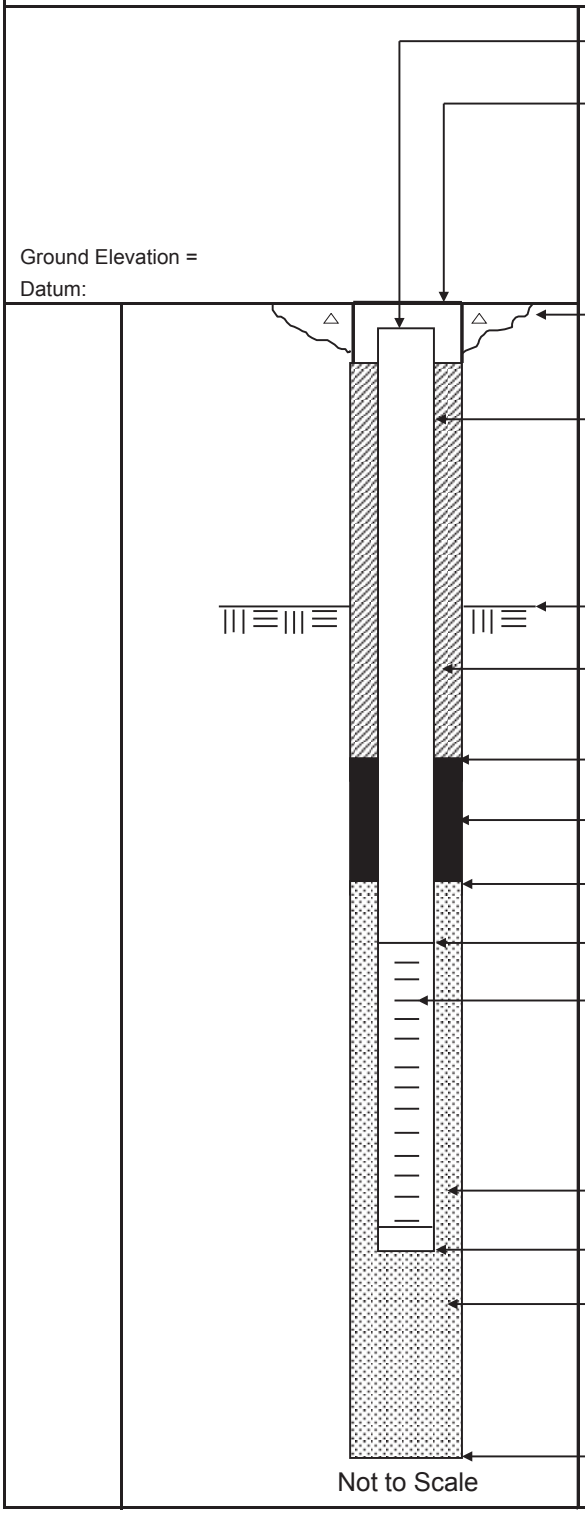
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0055
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

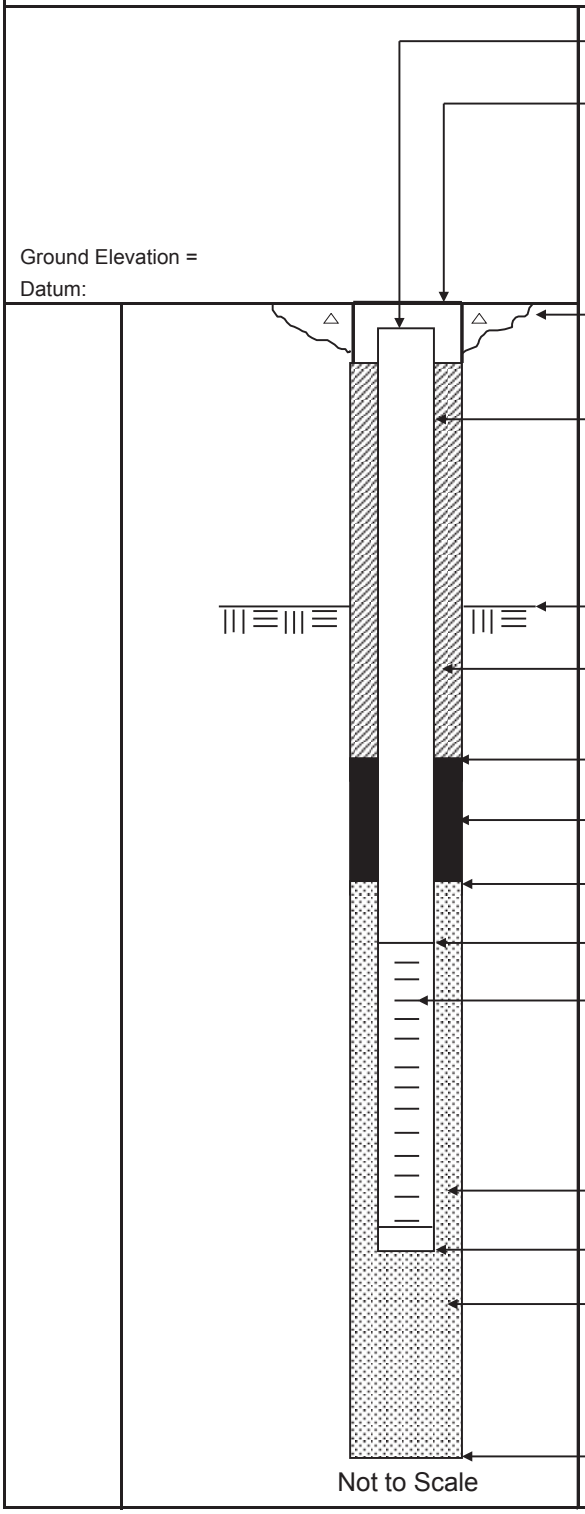
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0056
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

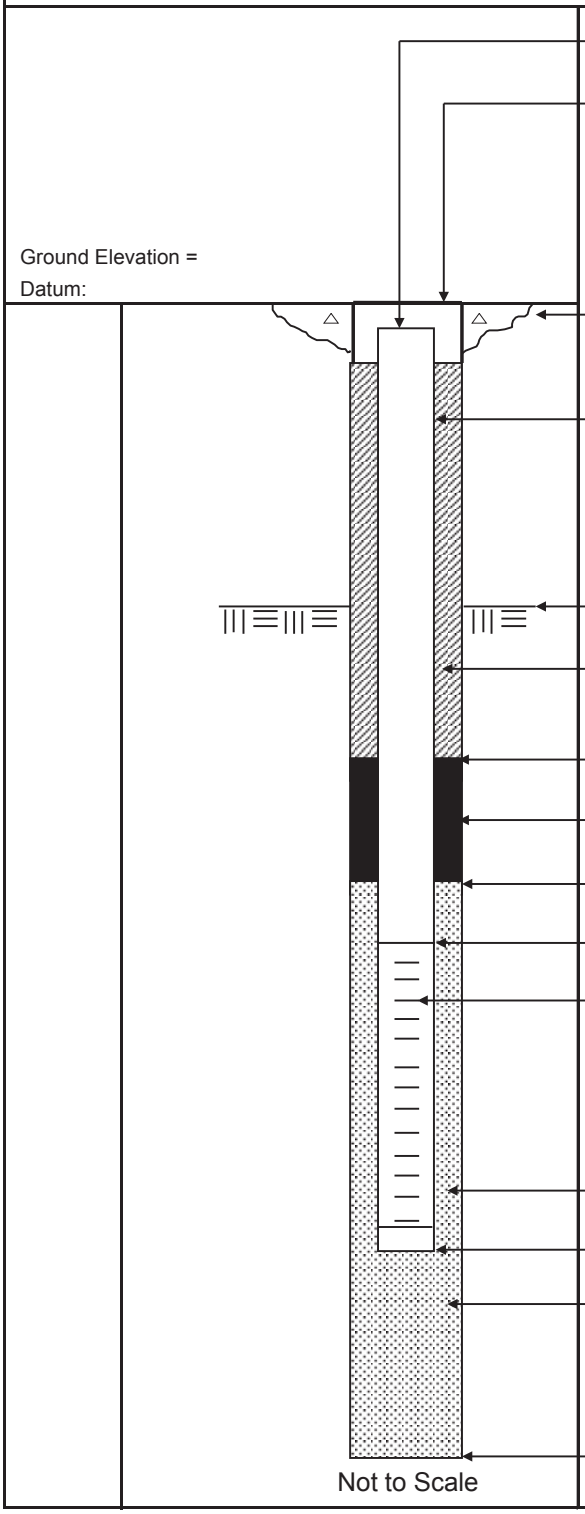
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0057
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

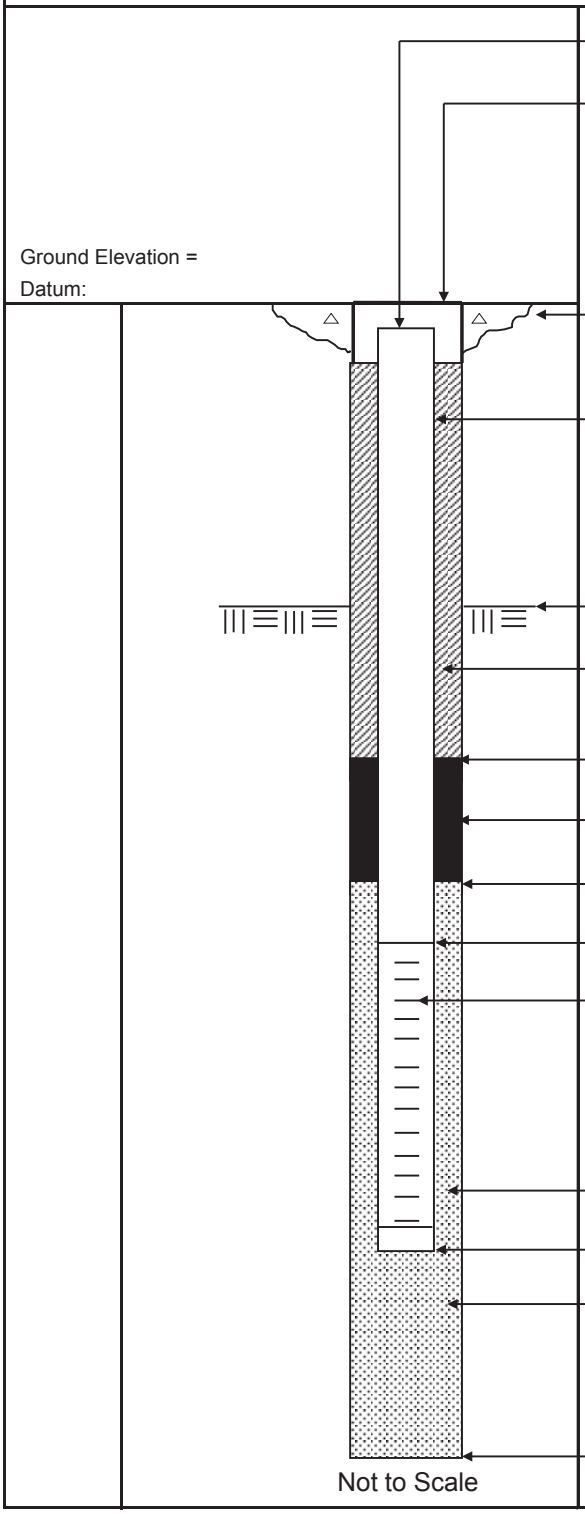
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0058
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

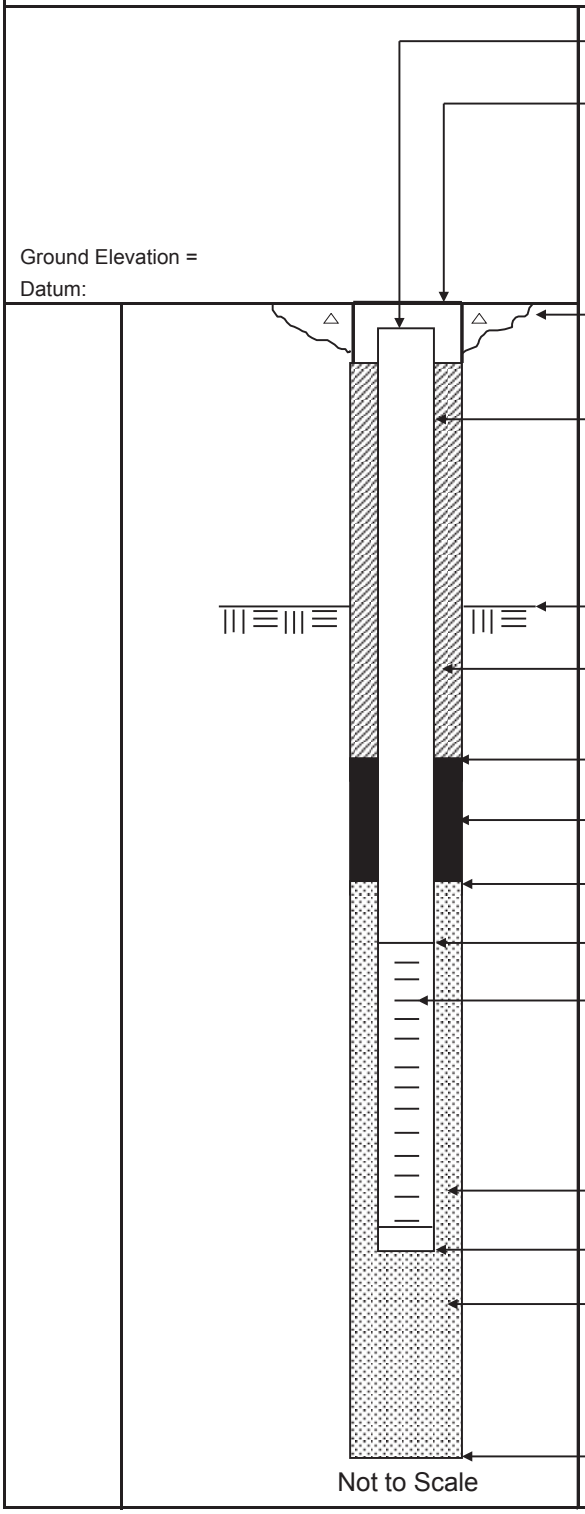
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0059
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

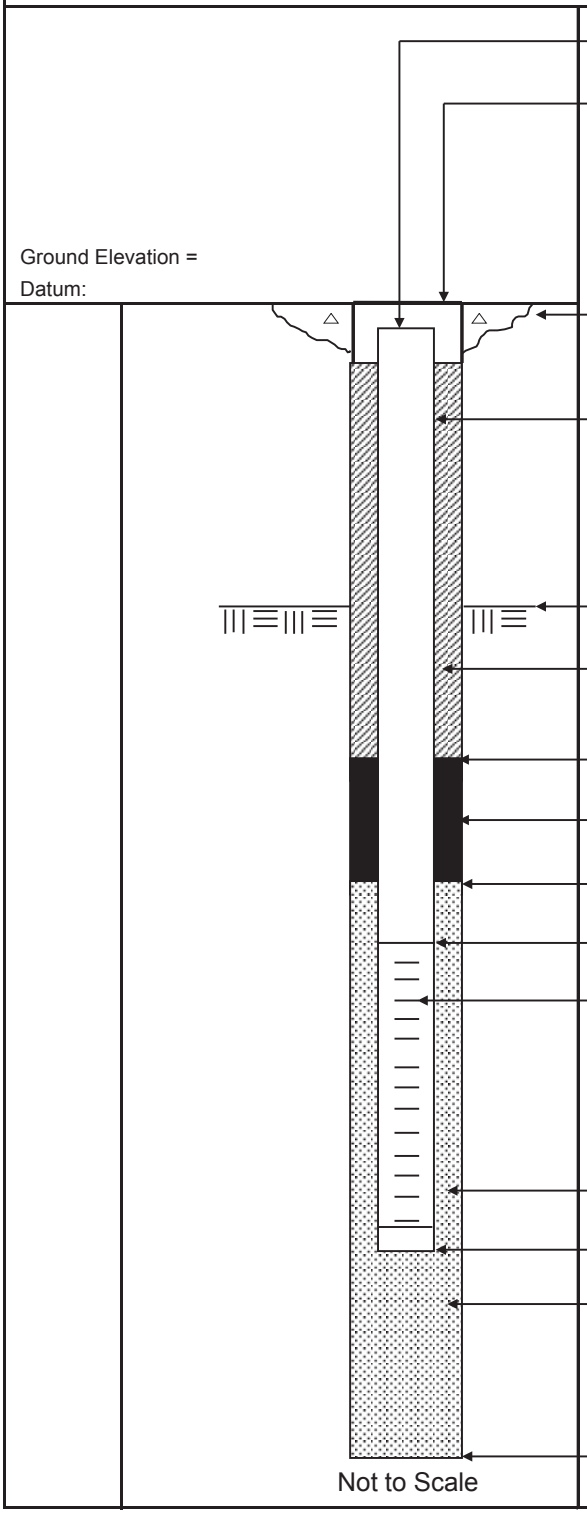
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0060
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

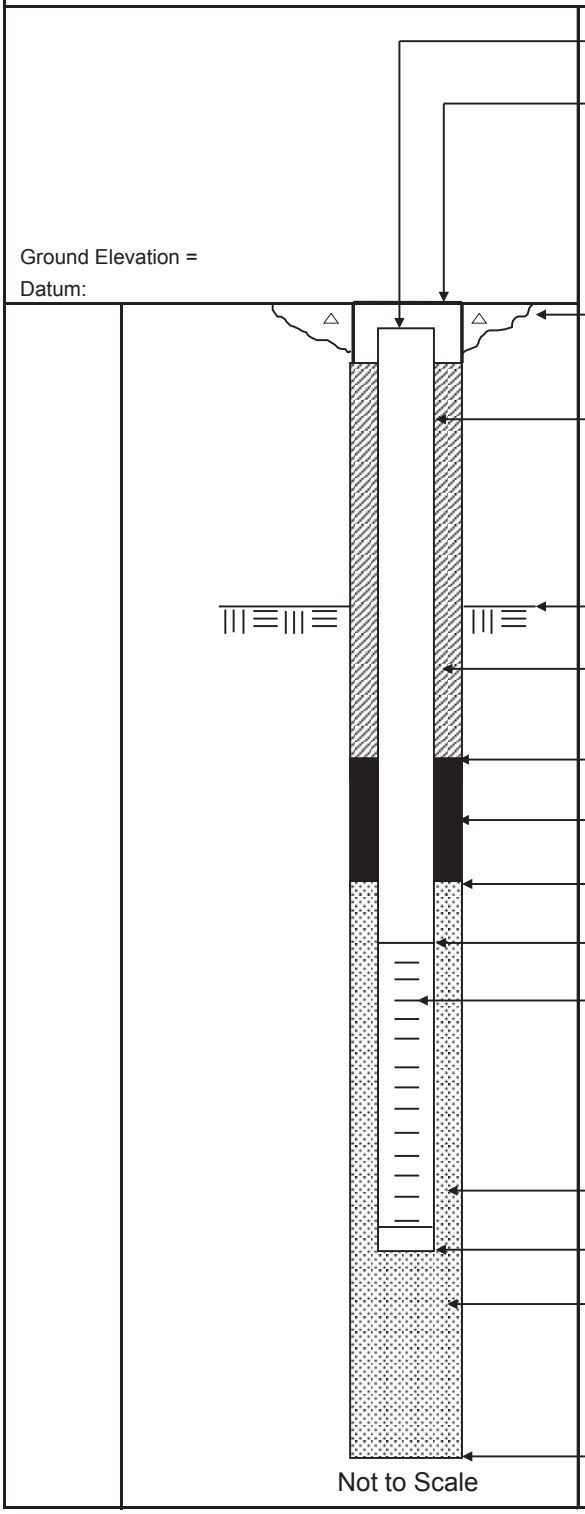
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0061
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

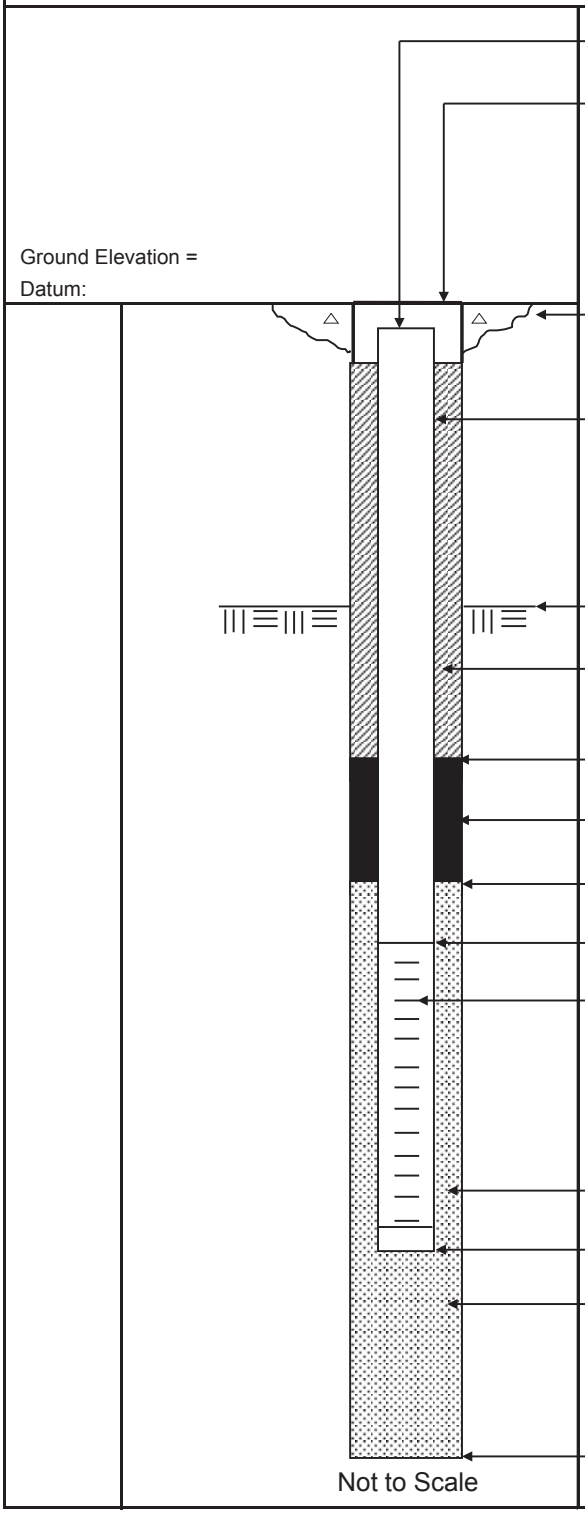
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0062
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

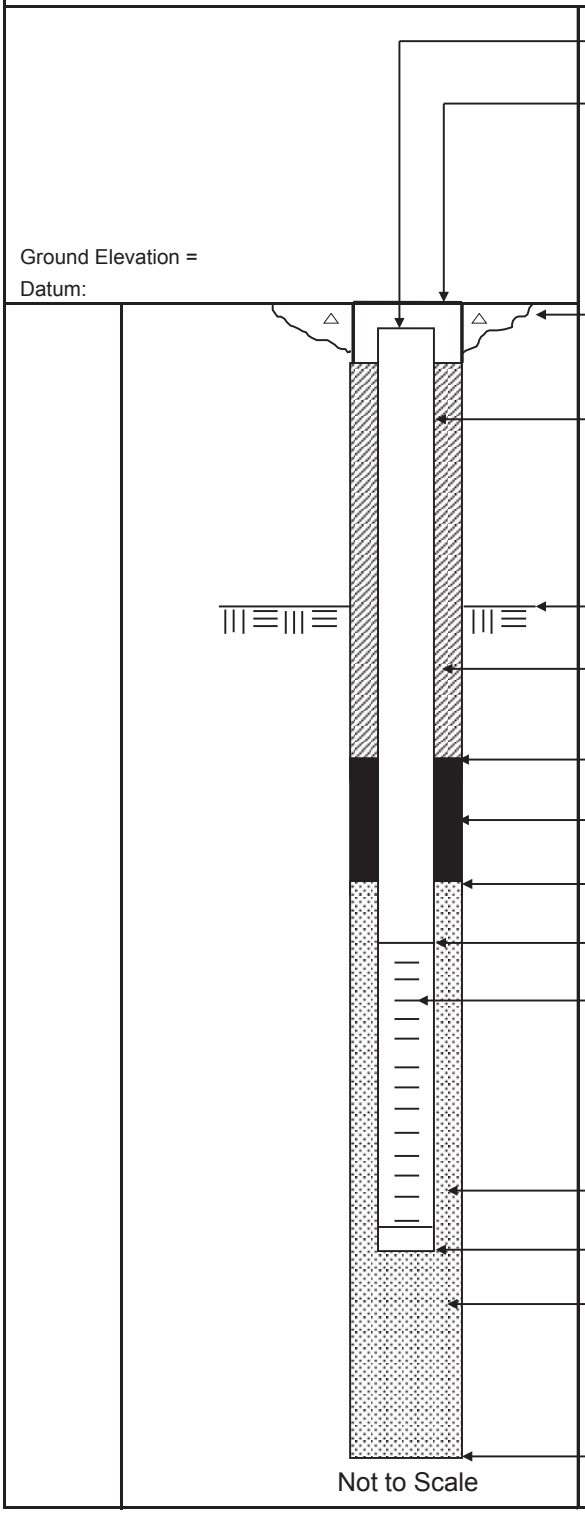
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0063
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/19/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

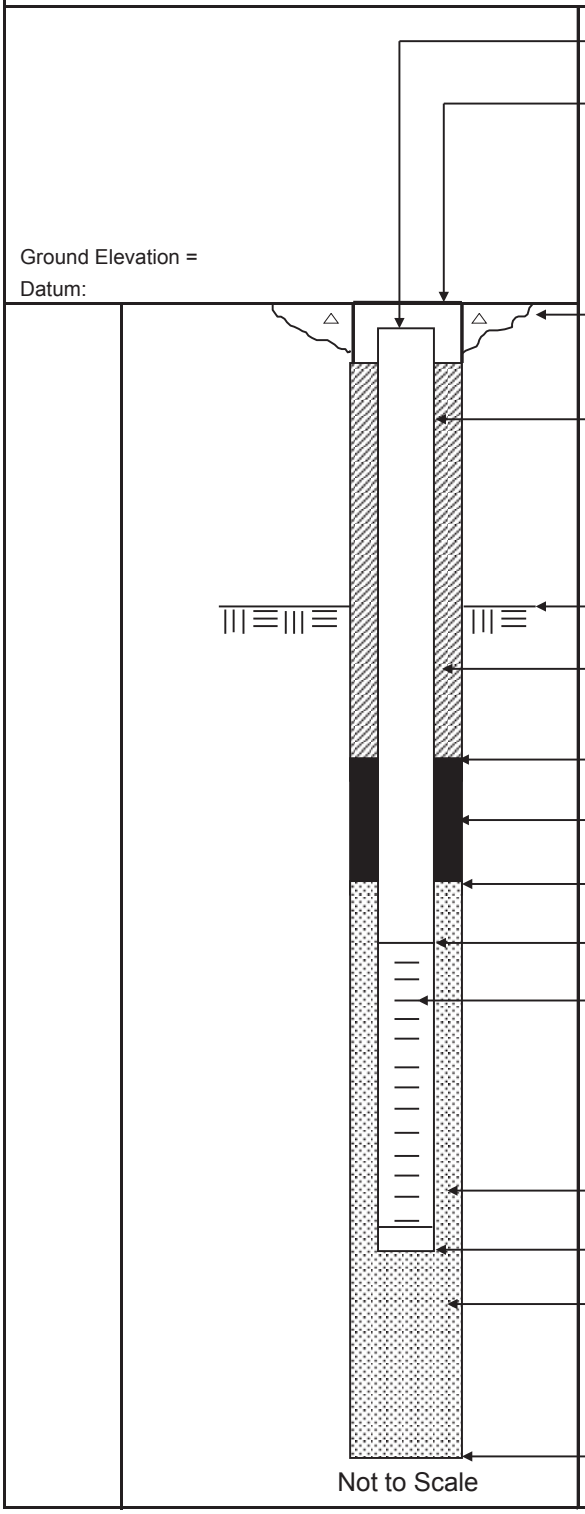
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0064
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

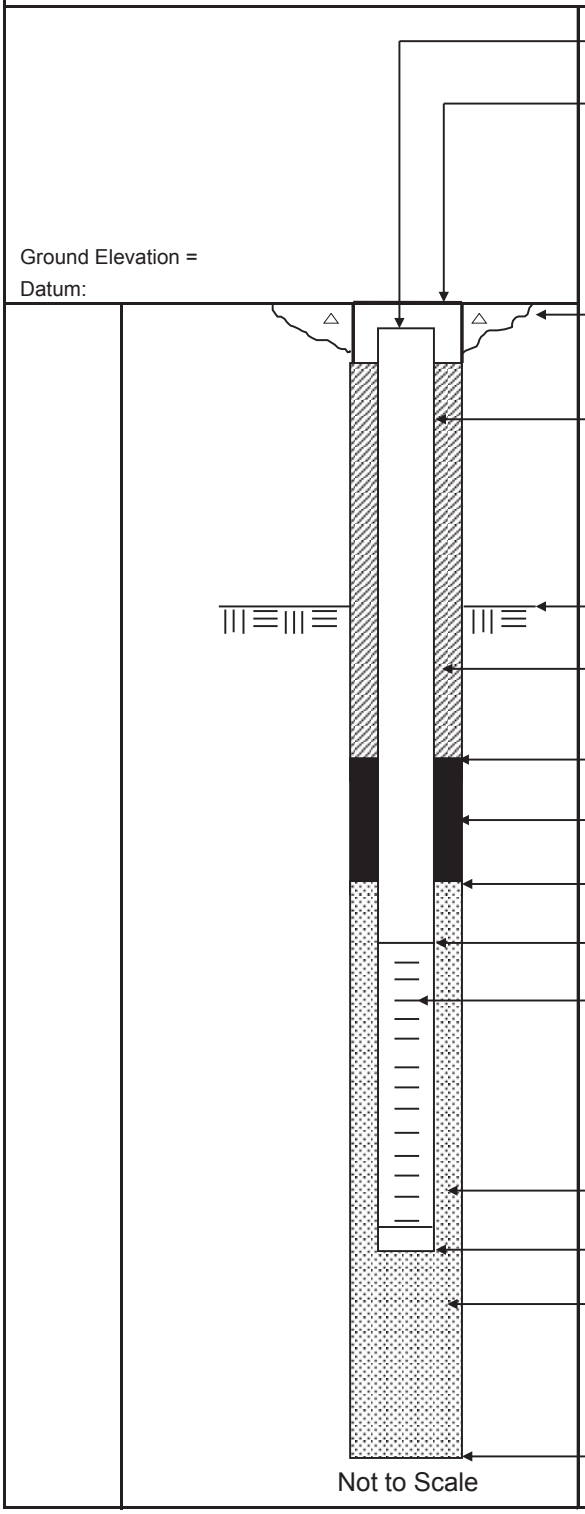
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0065
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

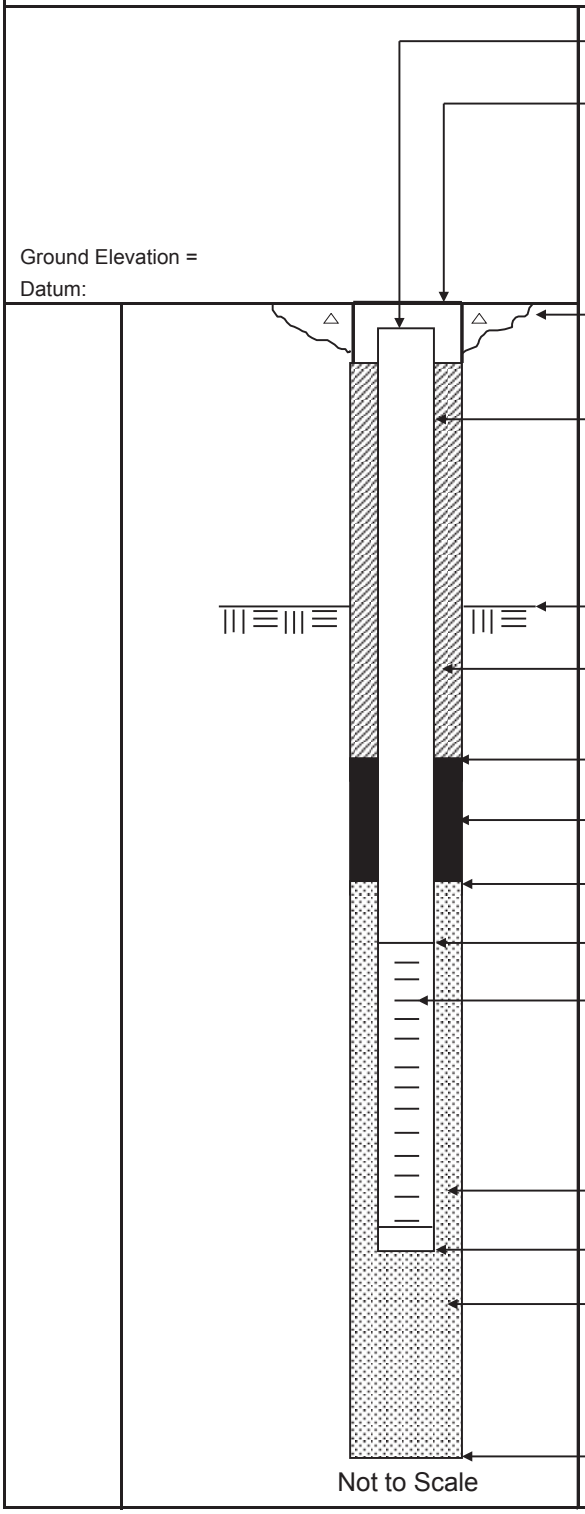
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0066
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

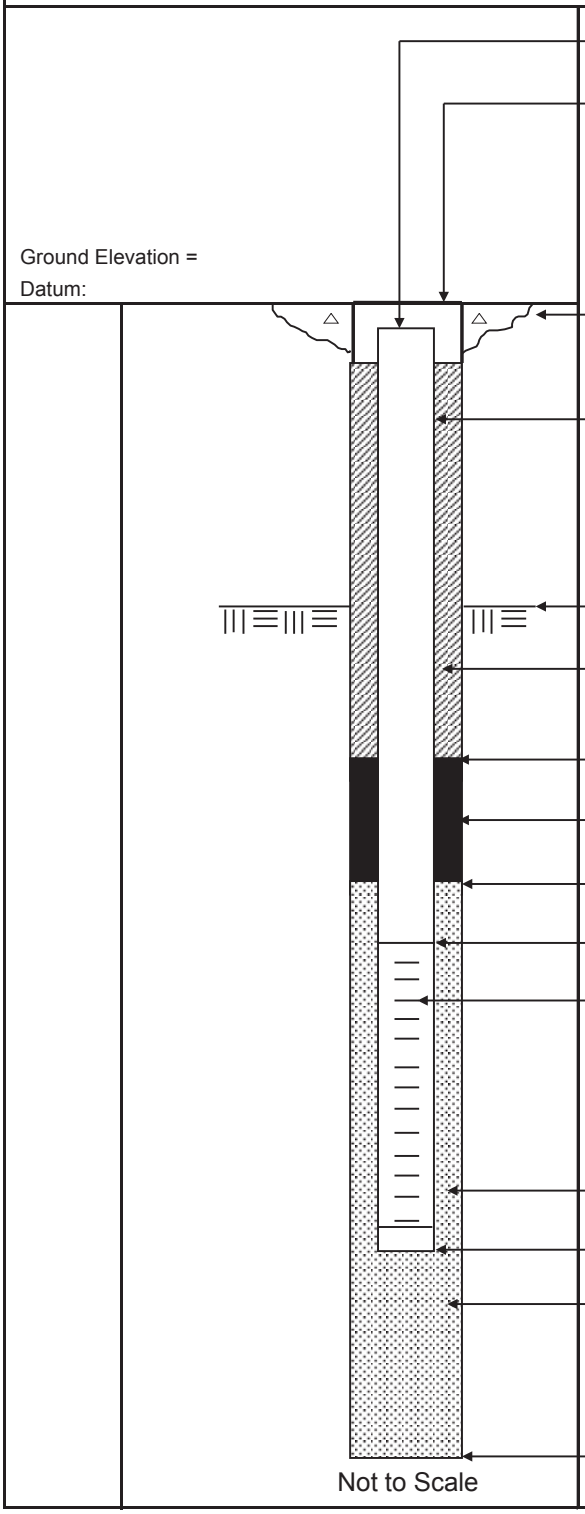
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0067
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

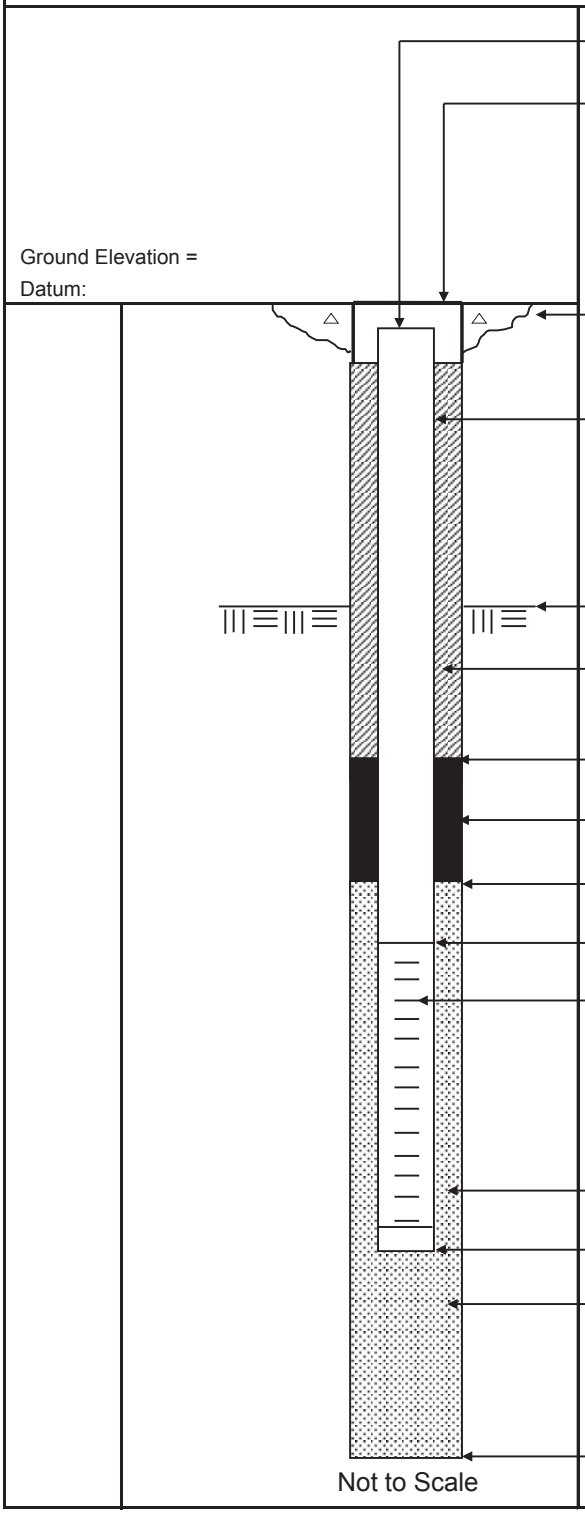
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0068
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

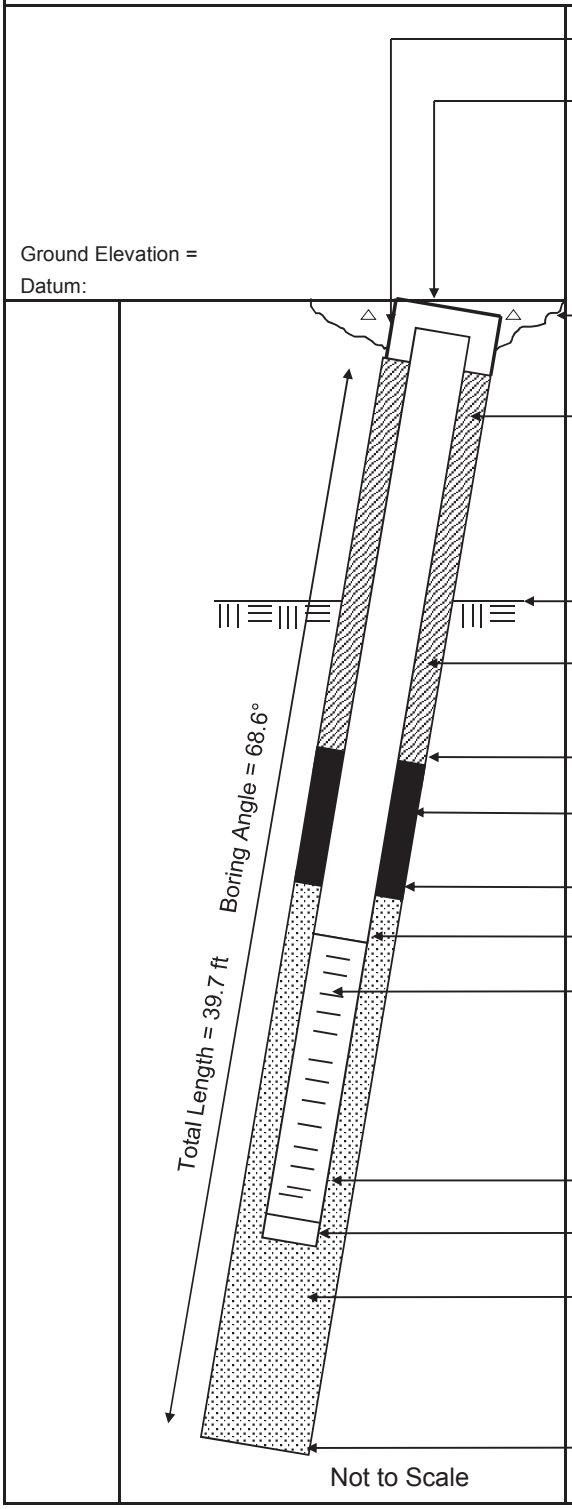
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 68.6 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0069
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



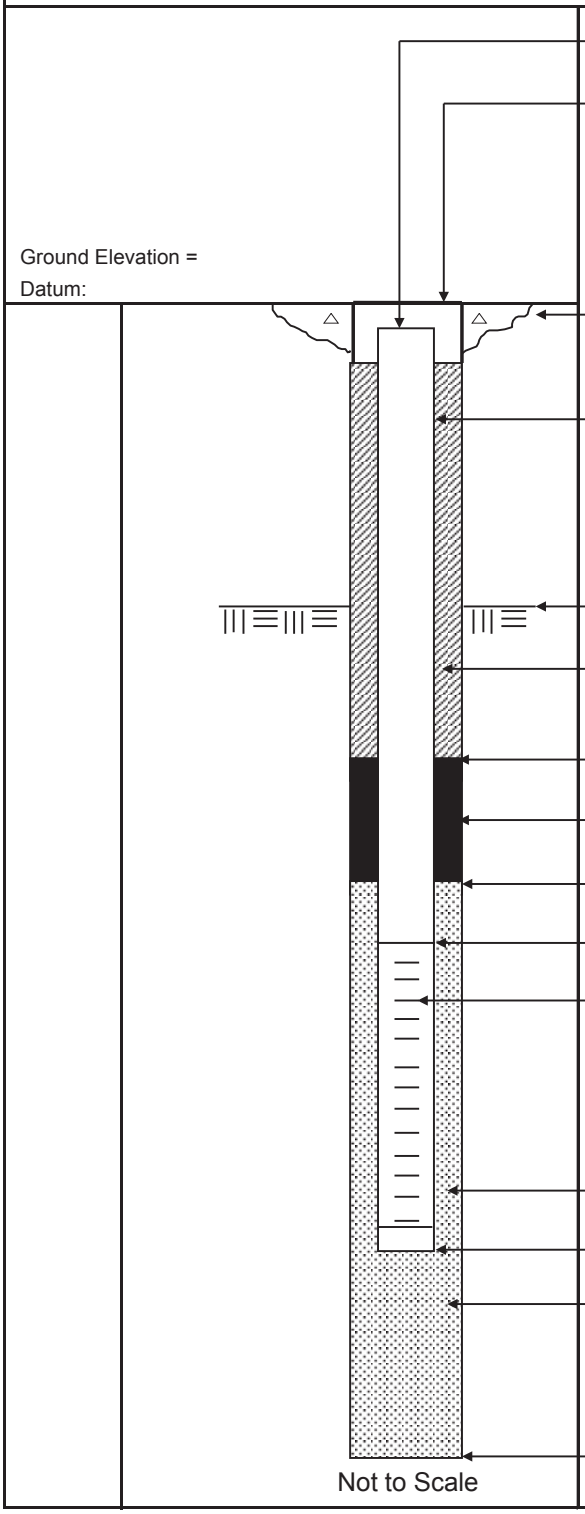
Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/ 0
I.D. of Surface Casing:		
Type of Surface Casing:		
Type of Surface Seal:		
Cement		
I.D. of Riser:	1"	
Type of Riser:	PVC	
Borehole Diameter:	4 Inch	
casing to foot depth		
Elevation / Depth Top of Rock:		/ NA
Type of Seal:	Portland	
Cement Grout		
Elevation / Depth of Seal:		/ 31.5
Type of Seal:	Bentonite	
Elevation / Depth of Top of Filter Pack:		/ 34.5
Elevation / Depth of Top of Diffuser:		/ 35.0
Type of Diffuser:	Schumasoil	
Slot Size x Length:	1" x 20" x 50 Micron	
I.D. of Diffuser:	1"	
Type of Filter Pack:	20/30 Filter Sand	
Elevation / Depth of Bottom of Diffuser:		/ 37.0
Elevation / Depth of Bottom of Filter Pack:		/ 37.0
Type of Backfill Below Well:		
Elevation / Total Depth of Borehole:		/ 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0070
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/22/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 41.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 44.5

Elevation / Depth of Top of Diffuser: / 45.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 47.0

Elevation / Depth of Bottom of Filter Pack: / 47.0

Type of Backfill Below Well: Bentonite

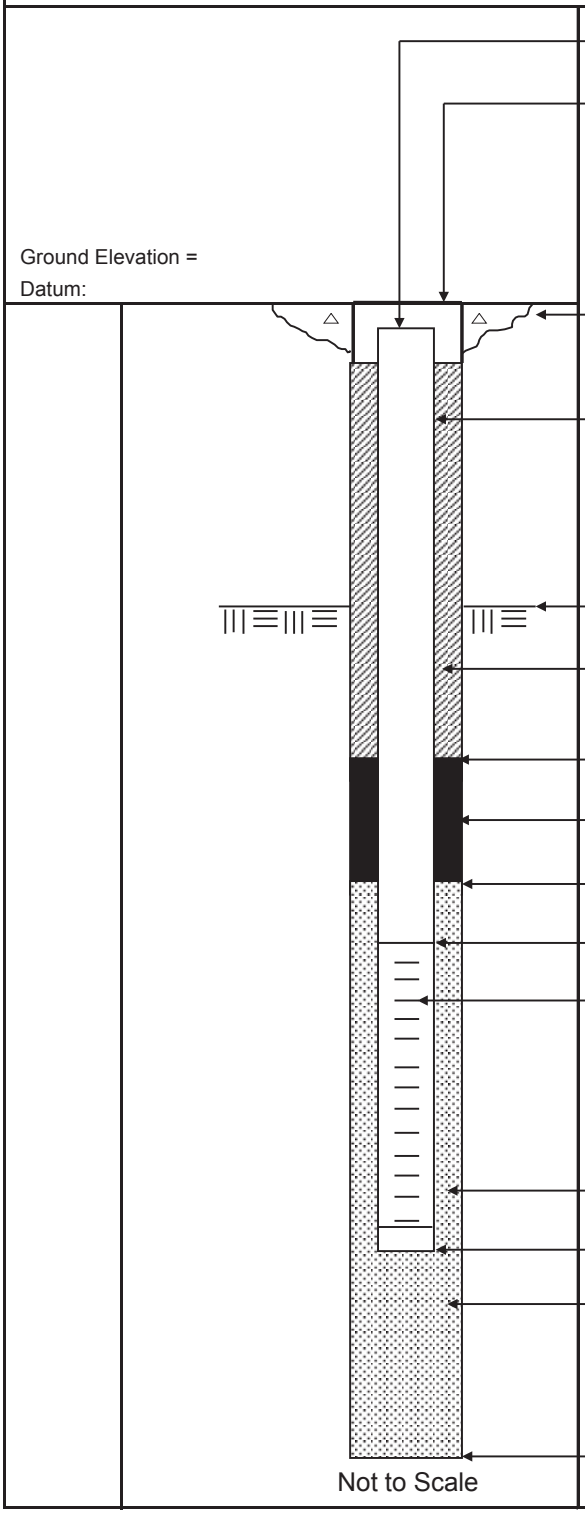
Elevation / Total Depth of Borehole: / 47.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0071
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/20/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

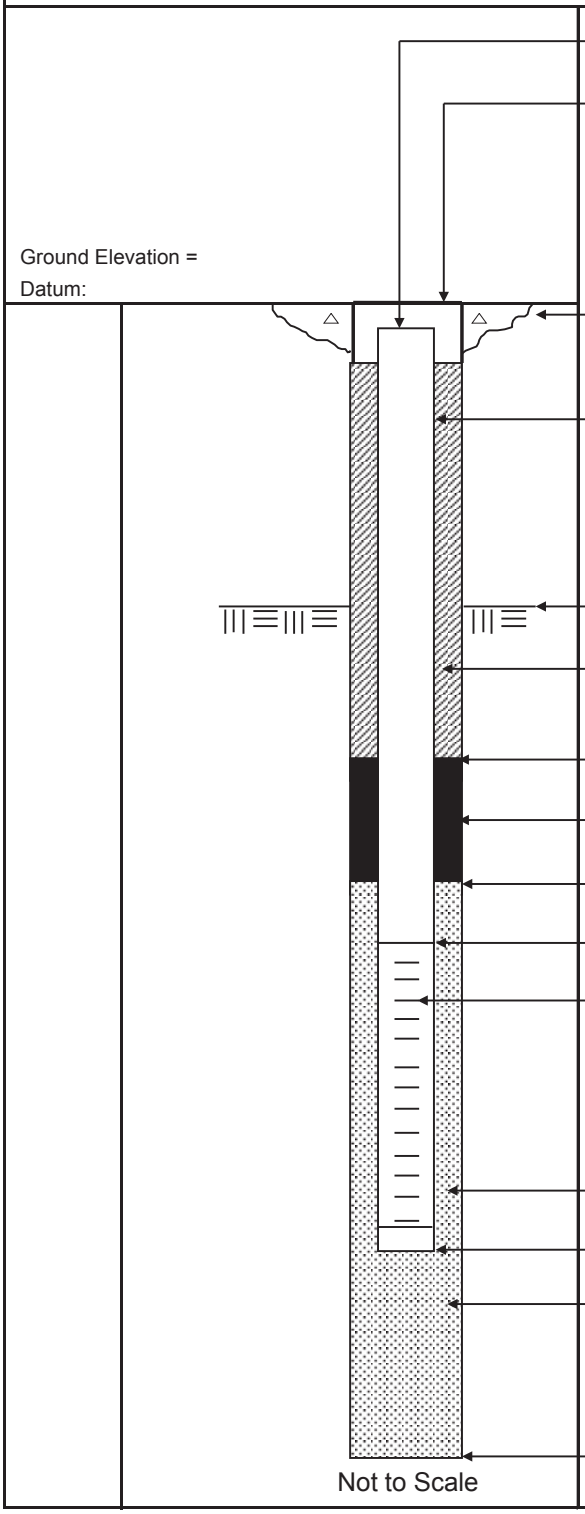
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0072
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

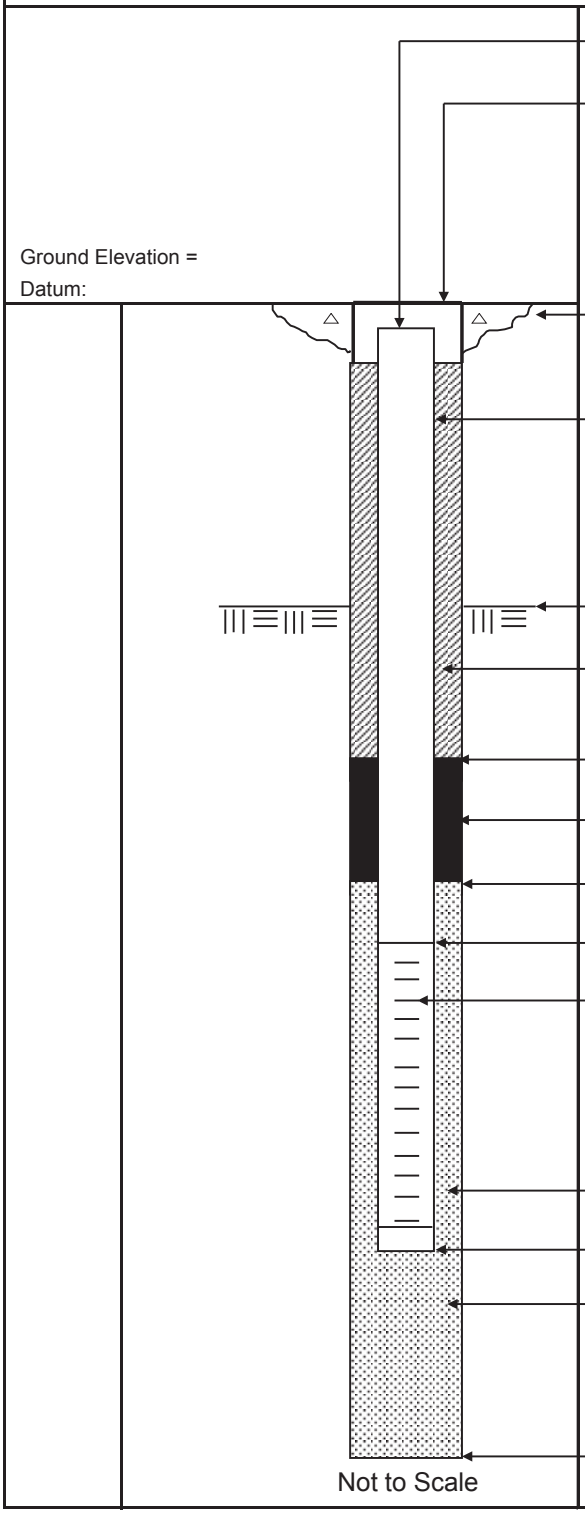
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0073
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

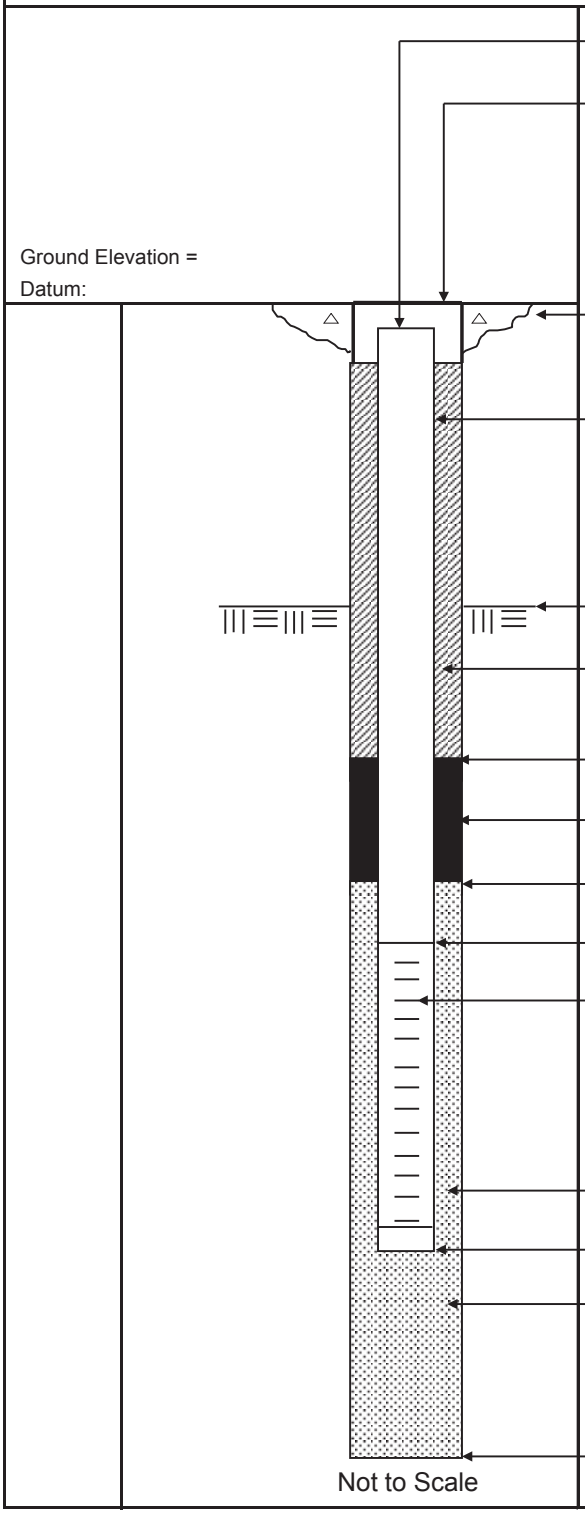
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0074
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/25/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 38.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 41.5

Elevation / Depth of Top of Diffuser: / 42.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 44.0

Elevation / Depth of Bottom of Filter Pack: / 44.0

Type of Backfill Below Well: Bentonite

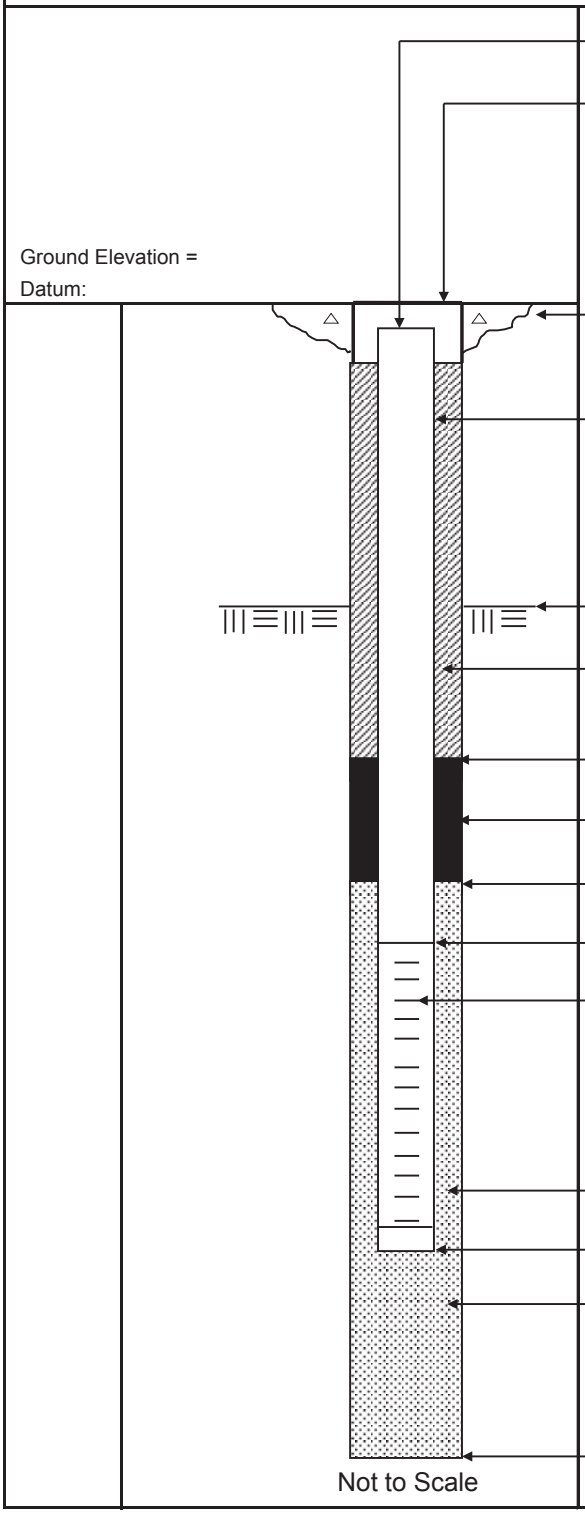
Elevation / Total Depth of Borehole: / 44.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0075
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/22/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 41.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 44.5

Elevation / Depth of Top of Diffuser: / 45.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 47.0

Elevation / Depth of Bottom of Filter Pack: / 47.0

Type of Backfill Below Well: Bentonite

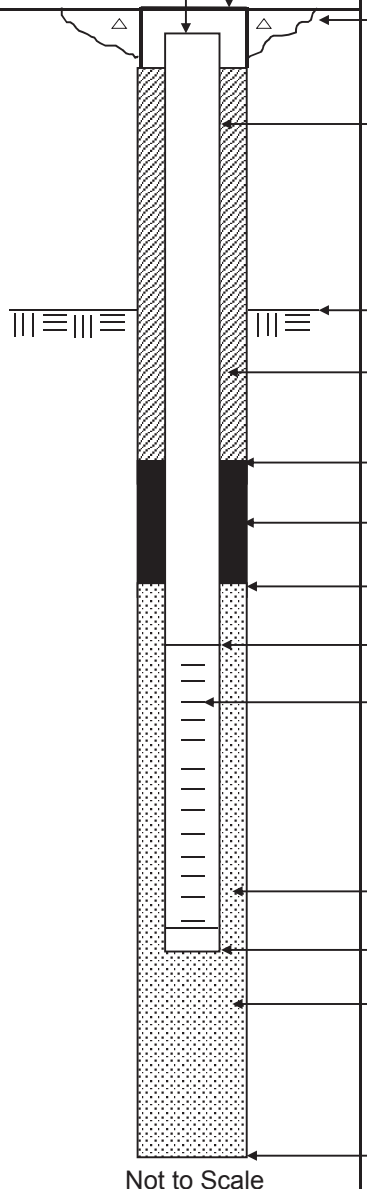
Elevation / Total Depth of Borehole: / 47.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0076
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/25/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal:

Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 36.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 39.5

Elevation / Depth of Top of Diffuser: / 40.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 42.0

Elevation / Depth of Bottom of Filter Pack: / 42.0

Type of Backfill Below Well:

Bentonite

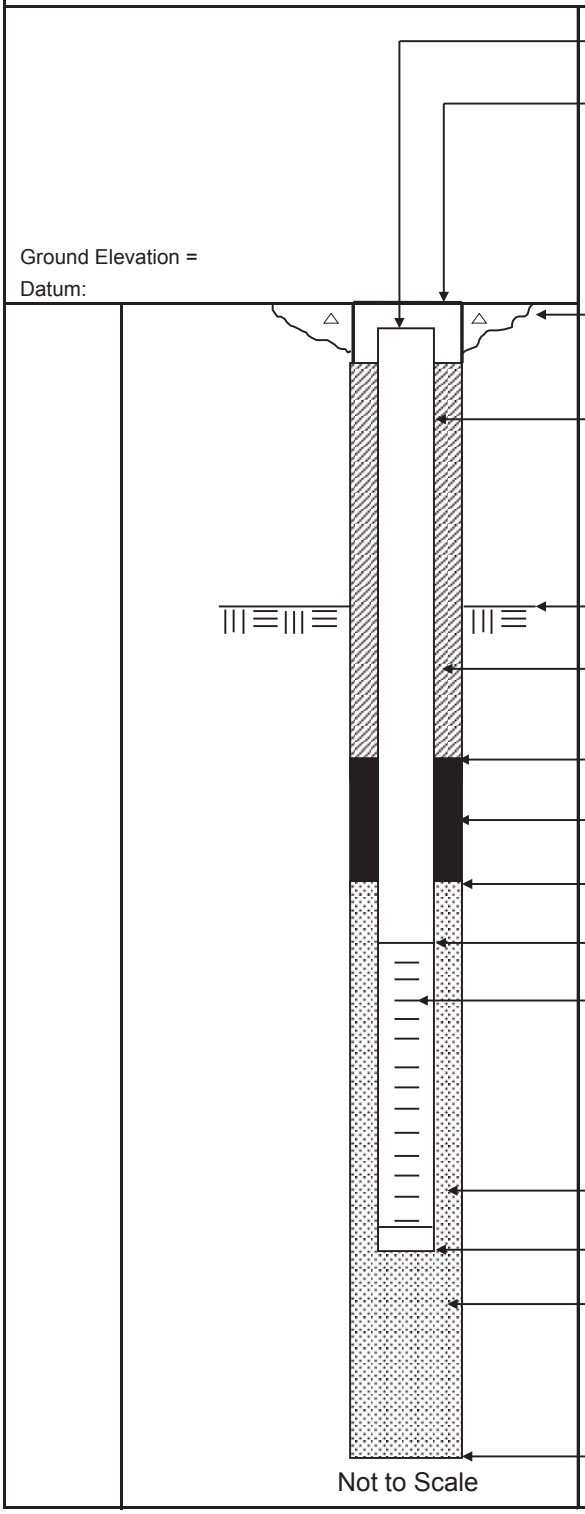
Elevation / Total Depth of Borehole: / 42.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0077
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

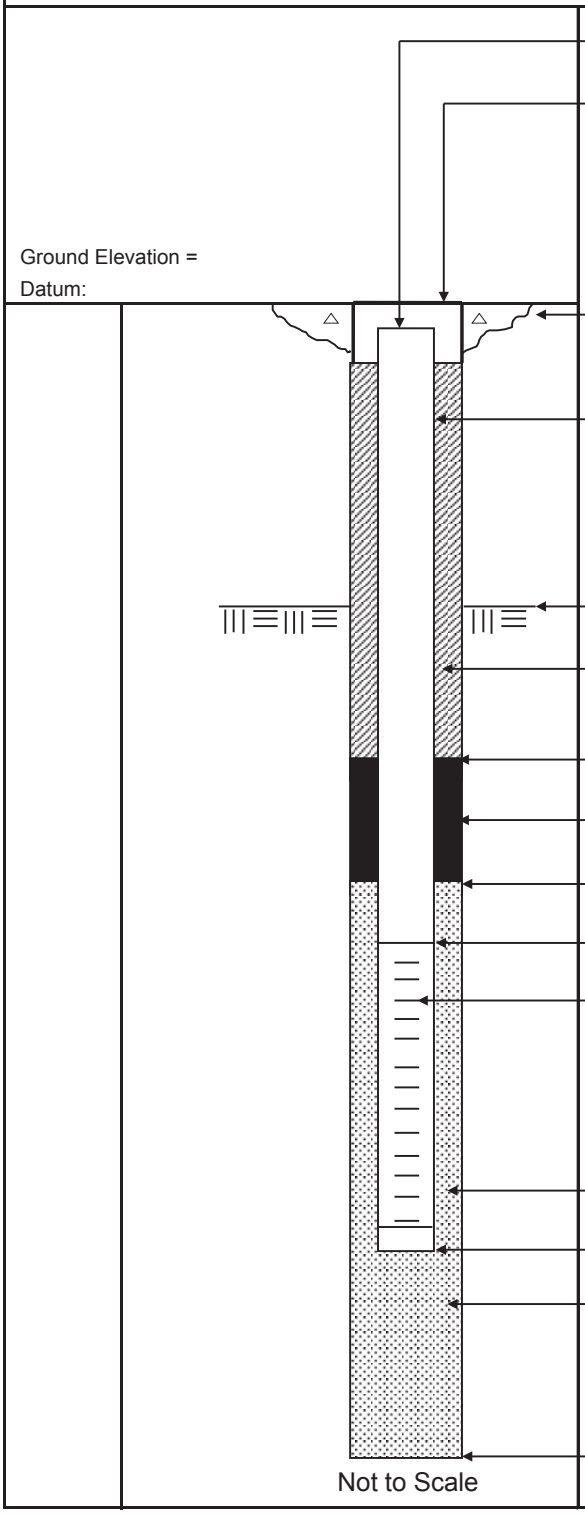
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0078
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/22/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 39.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 42.5

Elevation / Depth of Top of Diffuser: / 43.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 45.0

Elevation / Depth of Bottom of Filter Pack: / 45.0

Type of Backfill Below Well: Bentonite

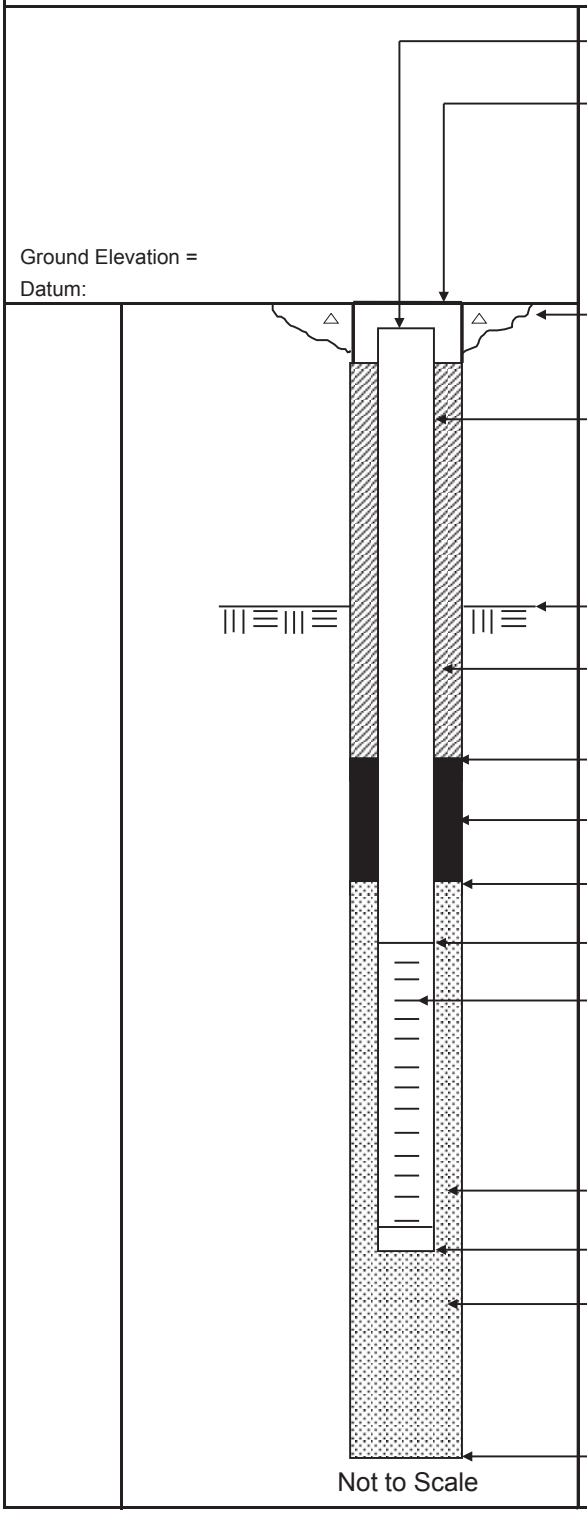
Elevation / Total Depth of Borehole: / 45.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0079
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/22/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 39.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 42.5

Elevation / Depth of Top of Diffuser: / 43.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 45.0

Elevation / Depth of Bottom of Filter Pack: / 45.0

Type of Backfill Below Well: Bentonite

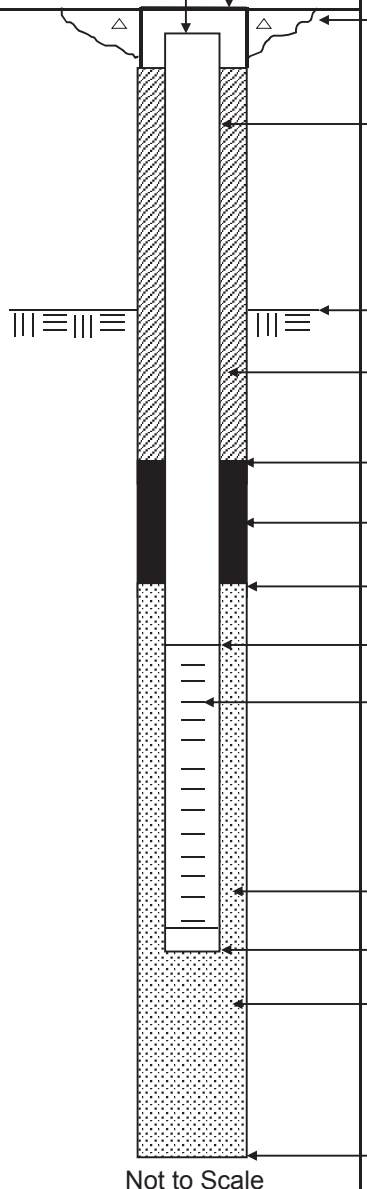
Elevation / Total Depth of Borehole: / 45.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0080
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal:

Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 42.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 45.5

Elevation / Depth of Top of Diffuser: / 46.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 48.0

Elevation / Depth of Bottom of Filter Pack: / 48.0

Type of Backfill Below Well:

Bentonite

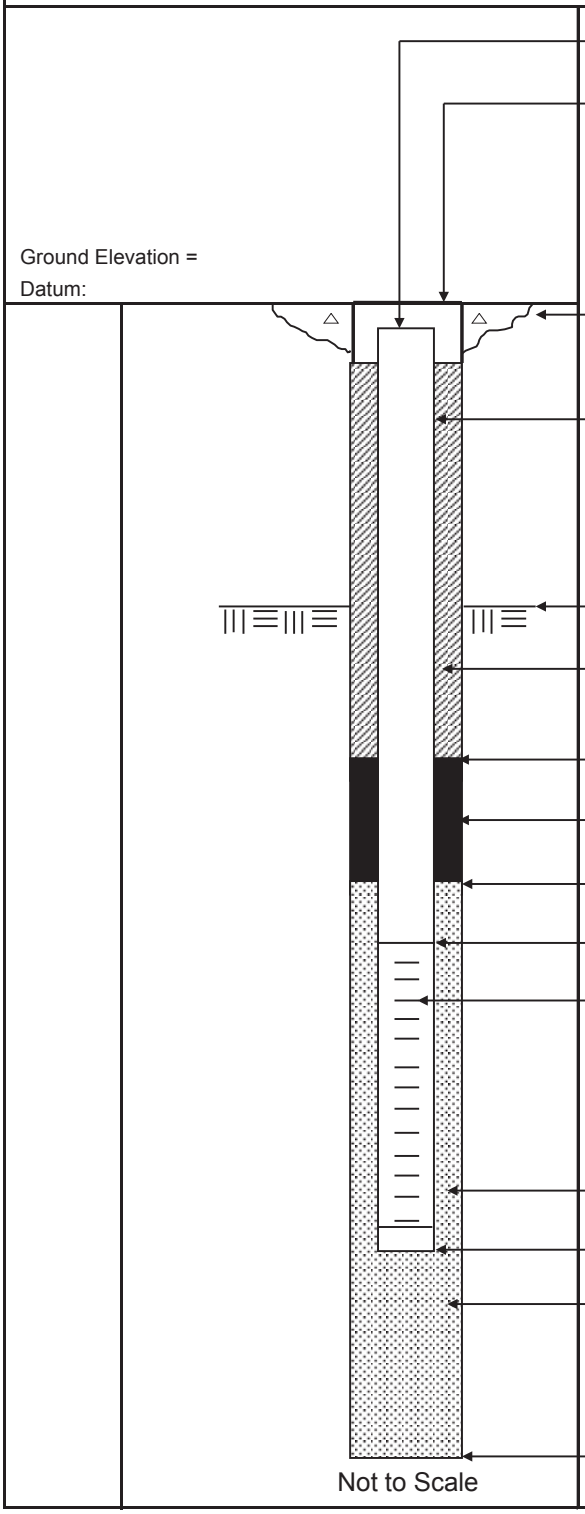
Elevation / Total Depth of Borehole: / 48.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0081
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/22/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

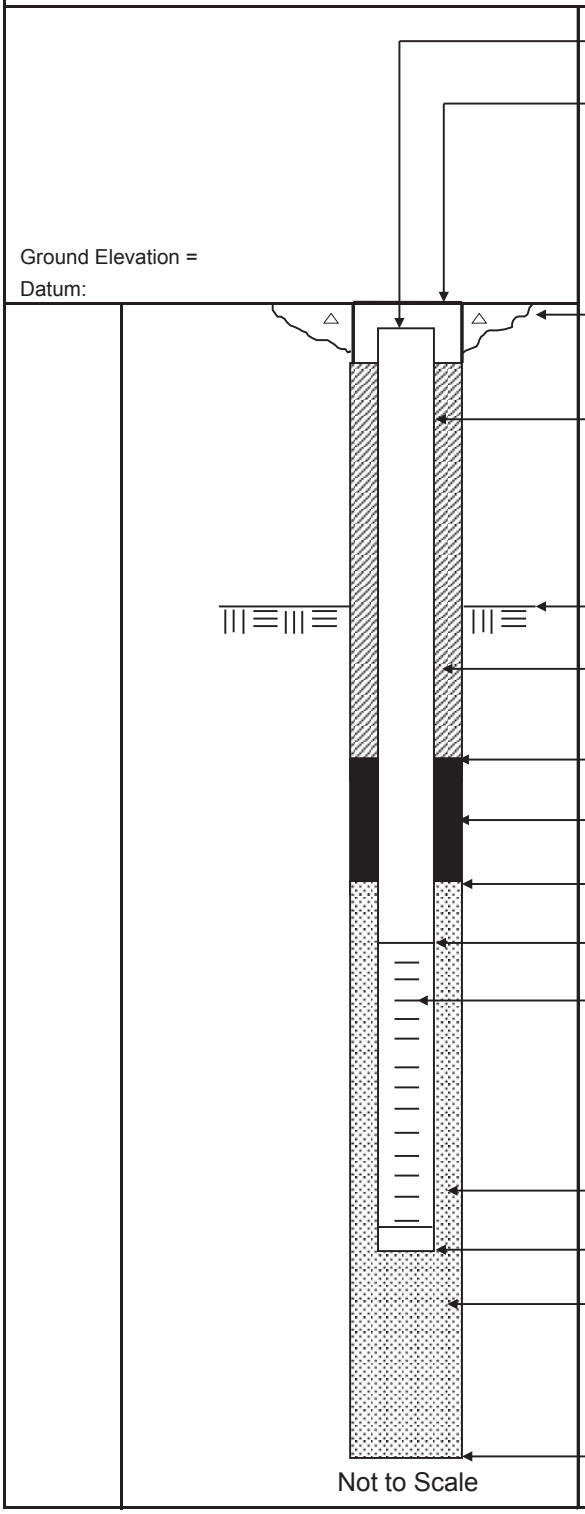
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0082
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/22/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

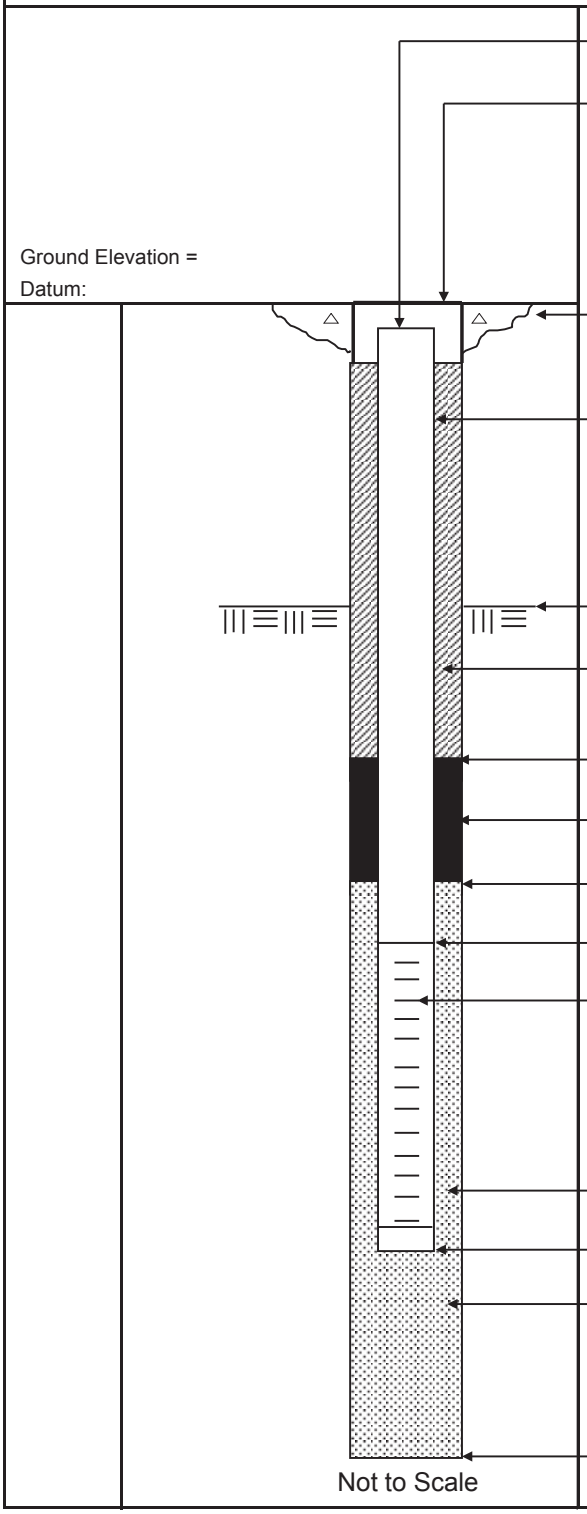
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0083
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/22/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

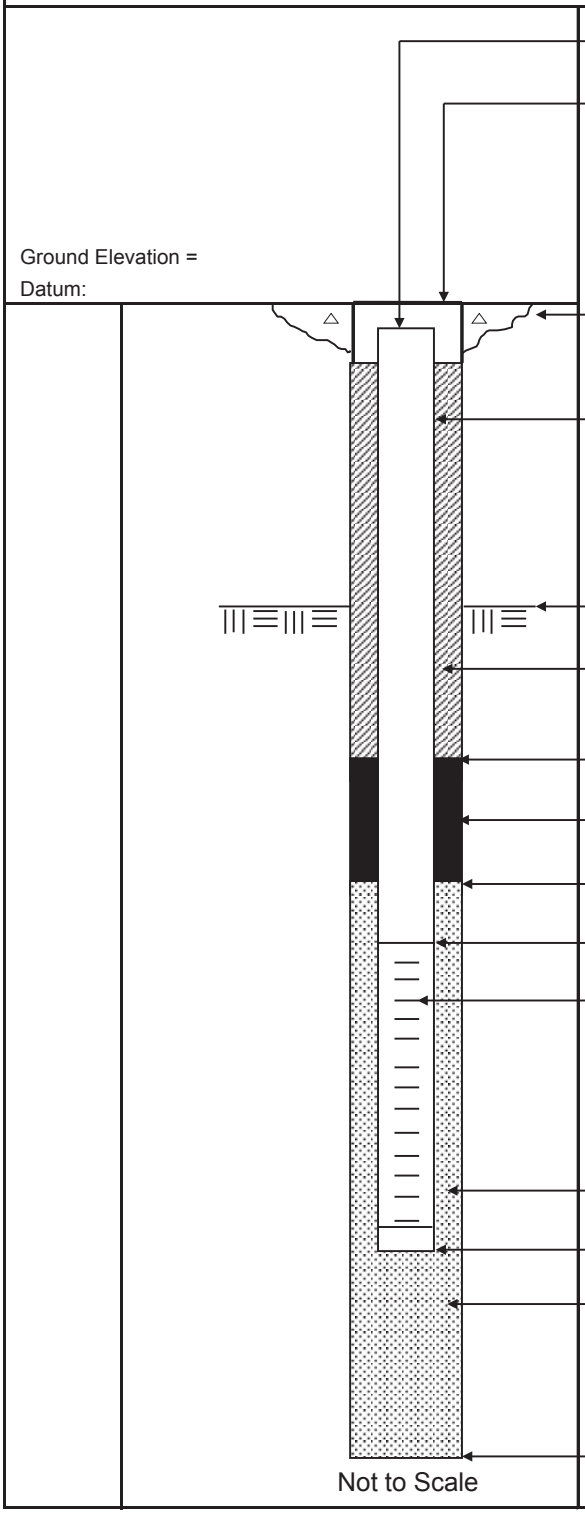
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0084
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

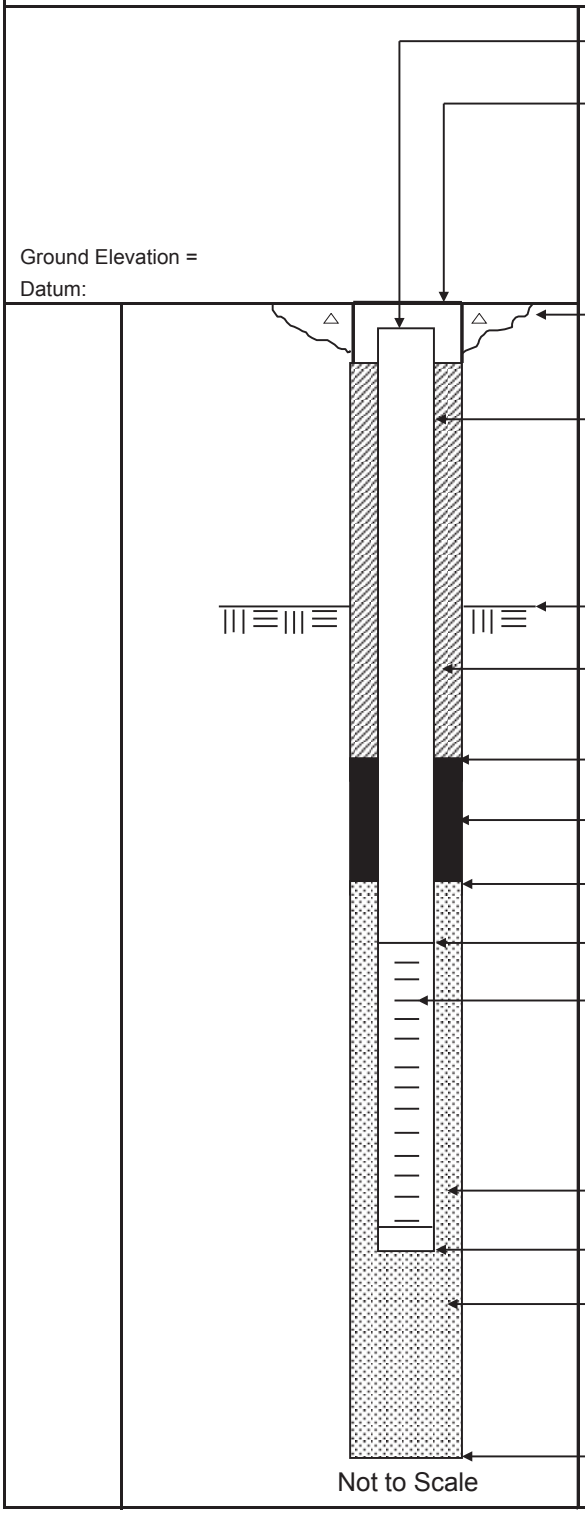
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0085
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/22/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

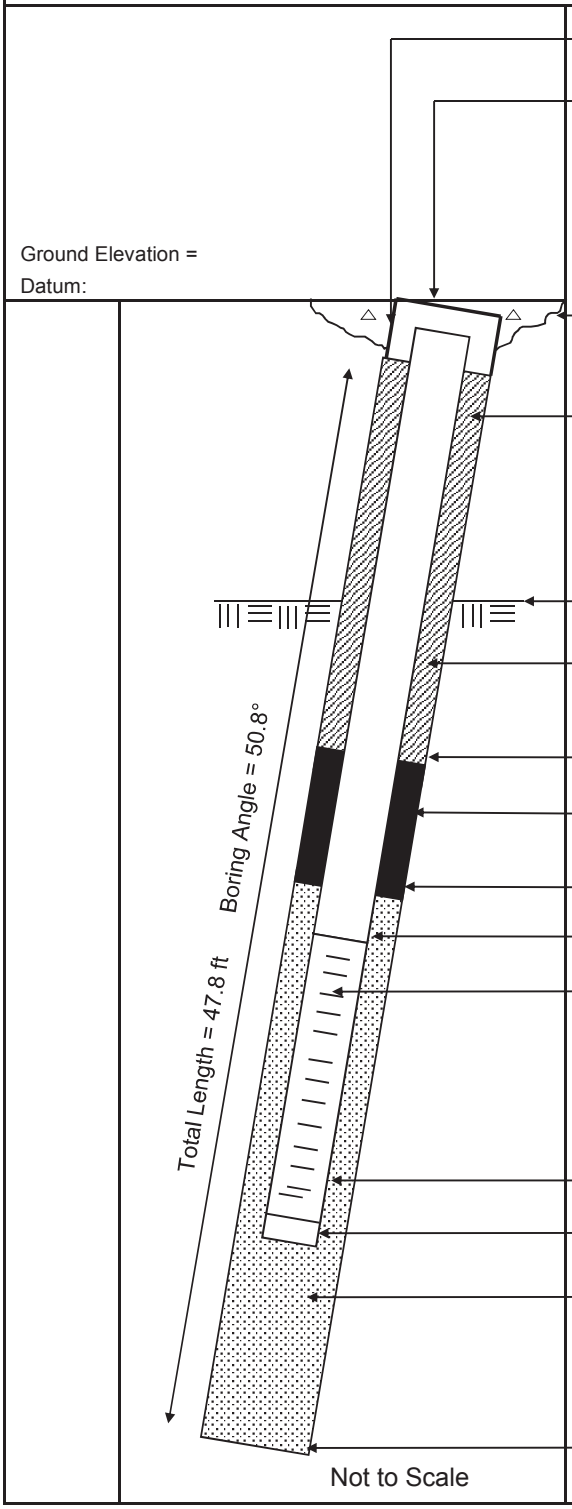
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 50.8 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0086
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/15/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



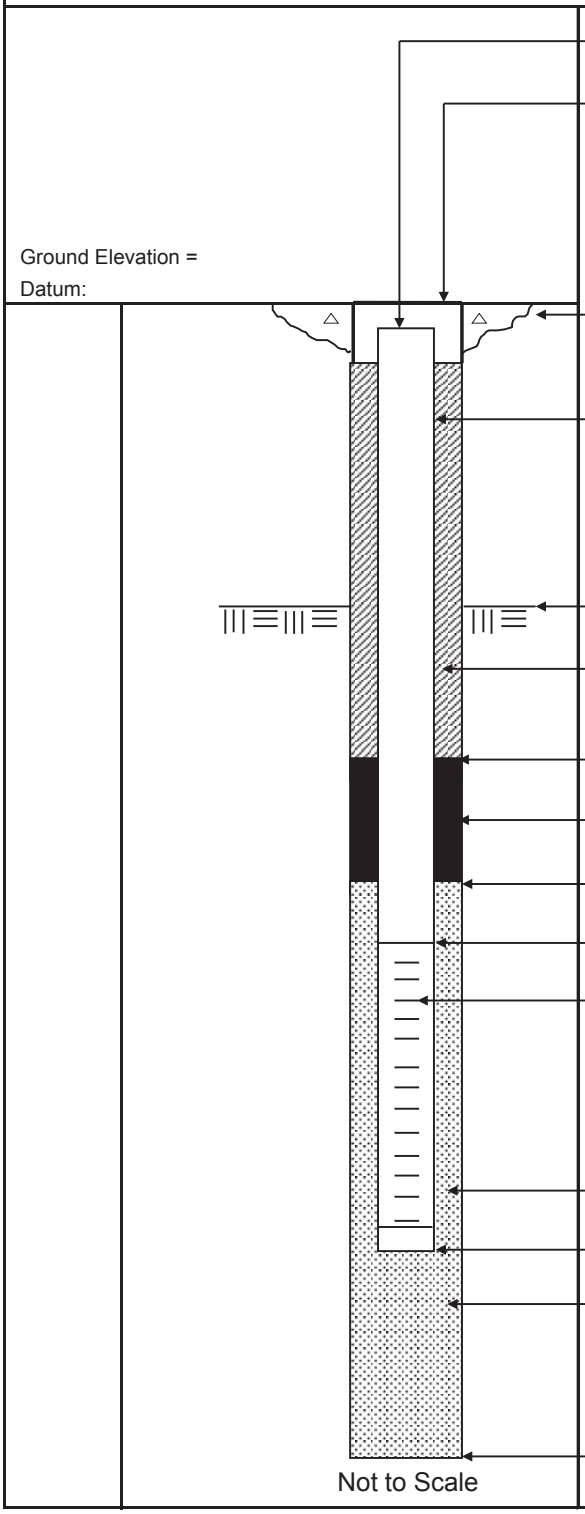
Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/ 0
I.D. of Surface Casing:		
Type of Surface Casing:		
Type of Surface Seal:		
Cement		
I.D. of Riser:	1"	
Type of Riser:	PVC	
Borehole Diameter:	4 Inch	
casing to foot depth		
Elevation / Depth Top of Rock:		/ NA
Type of Seal:	Portland	
Cement Grout		
Elevation / Depth of Seal:		/ 31.5
Type of Seal:	Bentonite	
Elevation / Depth of Top of Filter Pack:		/ 34.5
Elevation / Depth of Top of Diffuser:		/ 35.0
Type of Diffuser:	Schumasoil	
Slot Size x Length:	1" x 20" x 50 Micron	
I.D. of Diffuser:	1"	
Type of Filter Pack:	20/30 Filter Sand	
Elevation / Depth of Bottom of Diffuser:		/ 37.0
Elevation / Depth of Bottom of Filter Pack:		/ 37.0
Type of Backfill Below Well:		
Elevation / Total Depth of Borehole:		/ 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0087
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/15/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

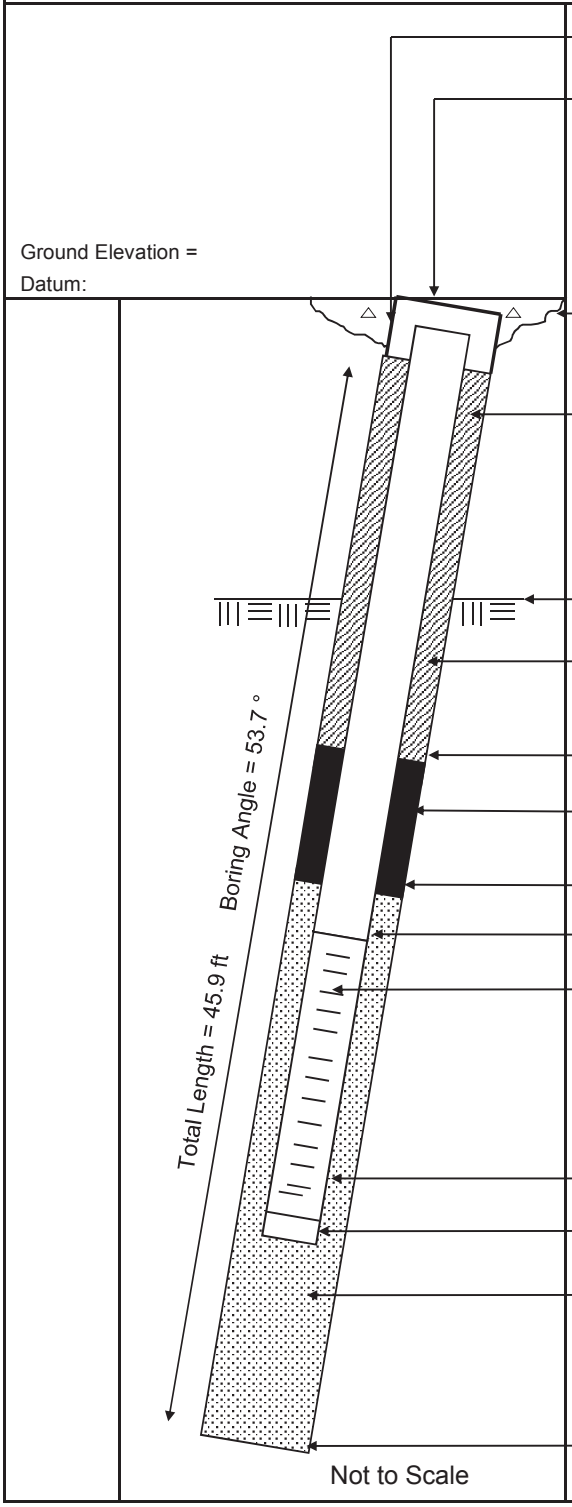
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 53.7 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0088
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal:

Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

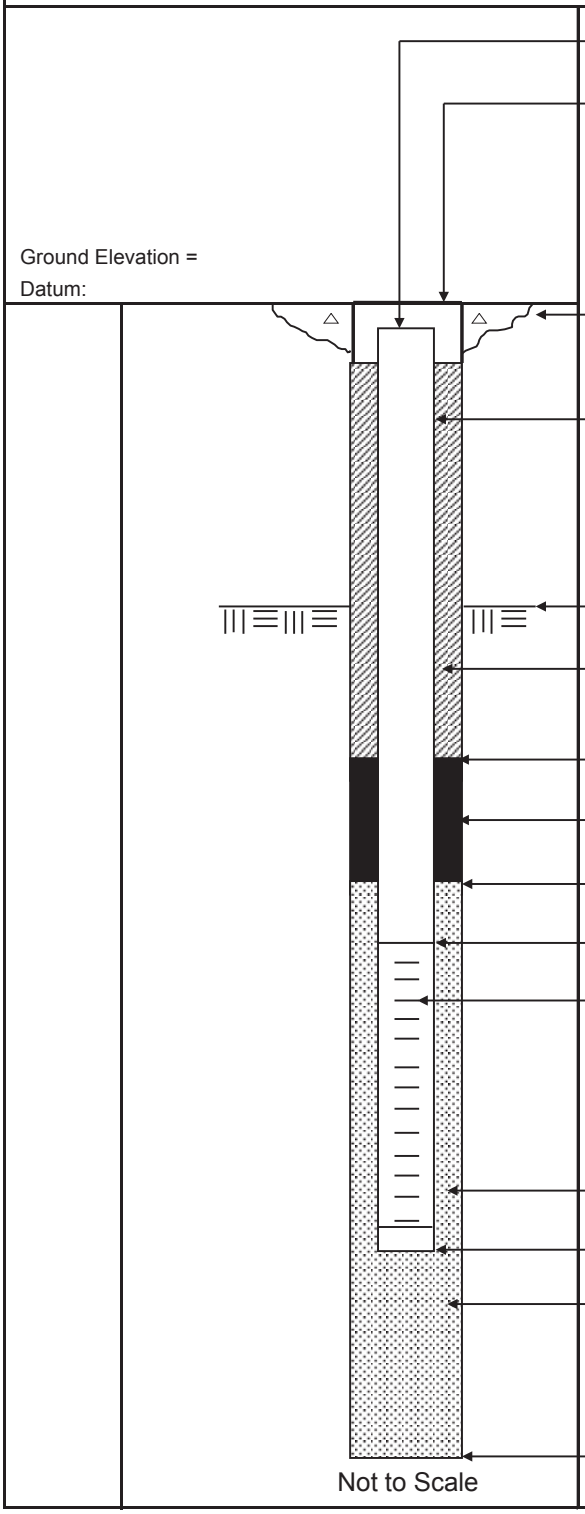
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0089
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/12/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

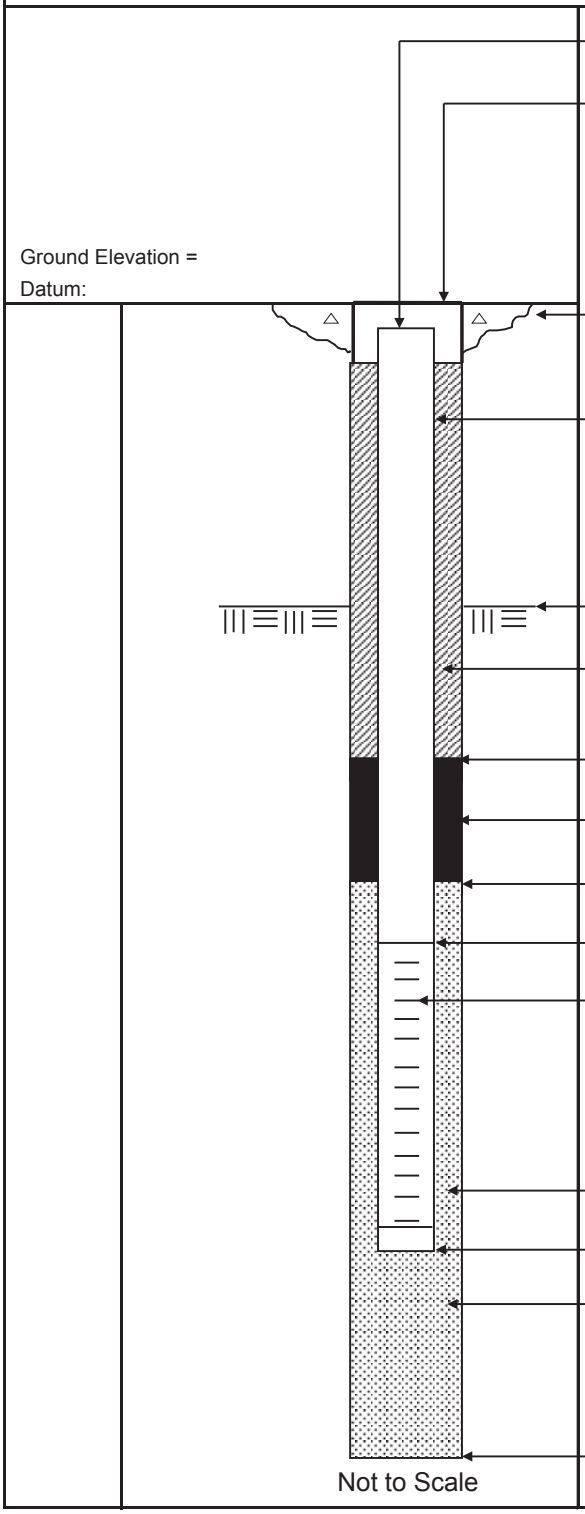
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0090
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/12/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

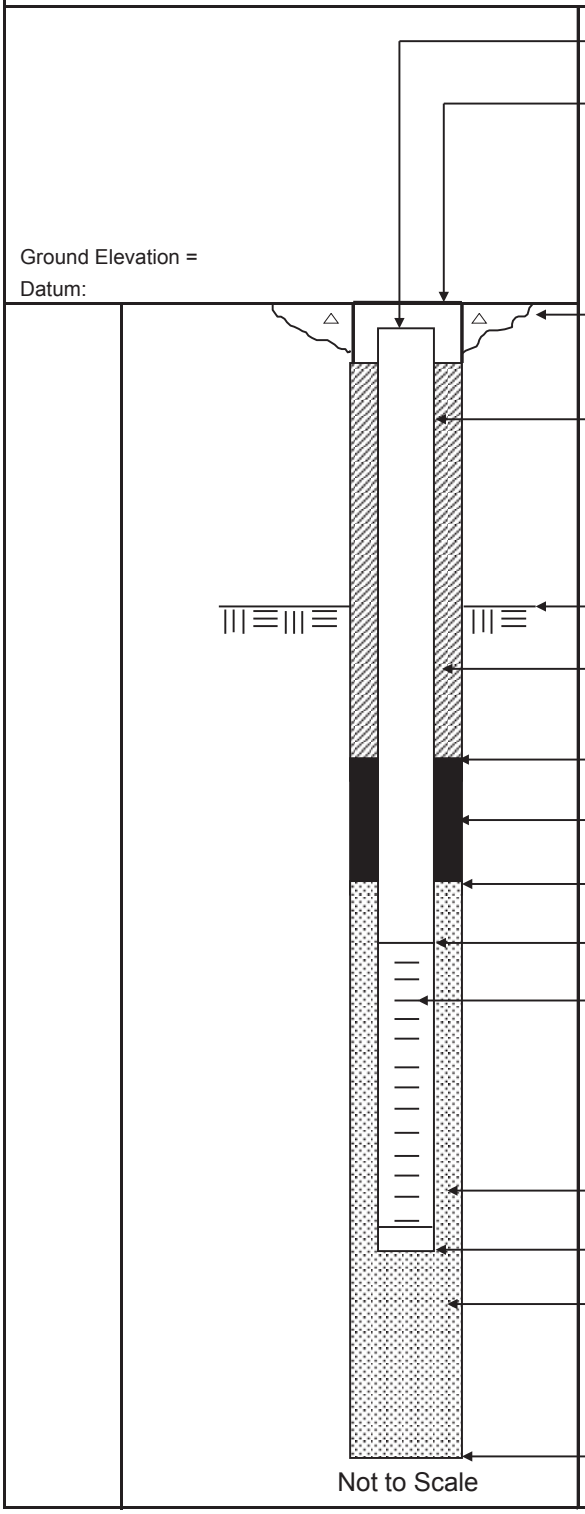
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0091
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

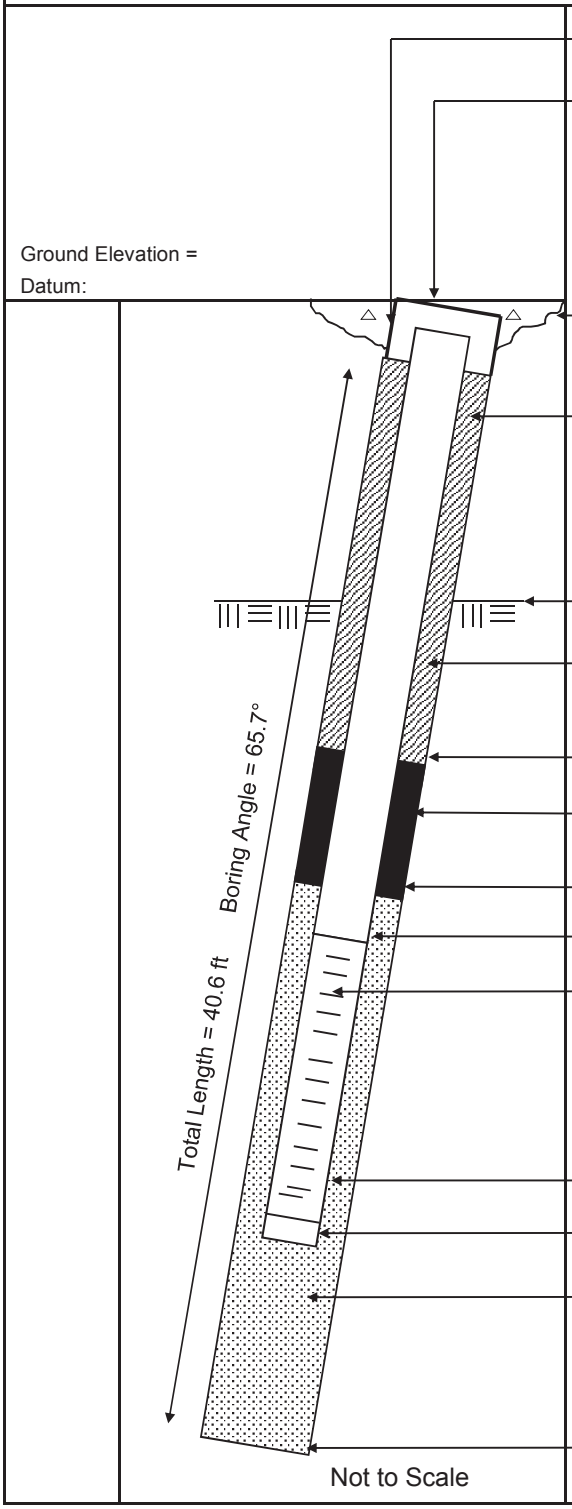
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 65.7 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0092
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/15/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

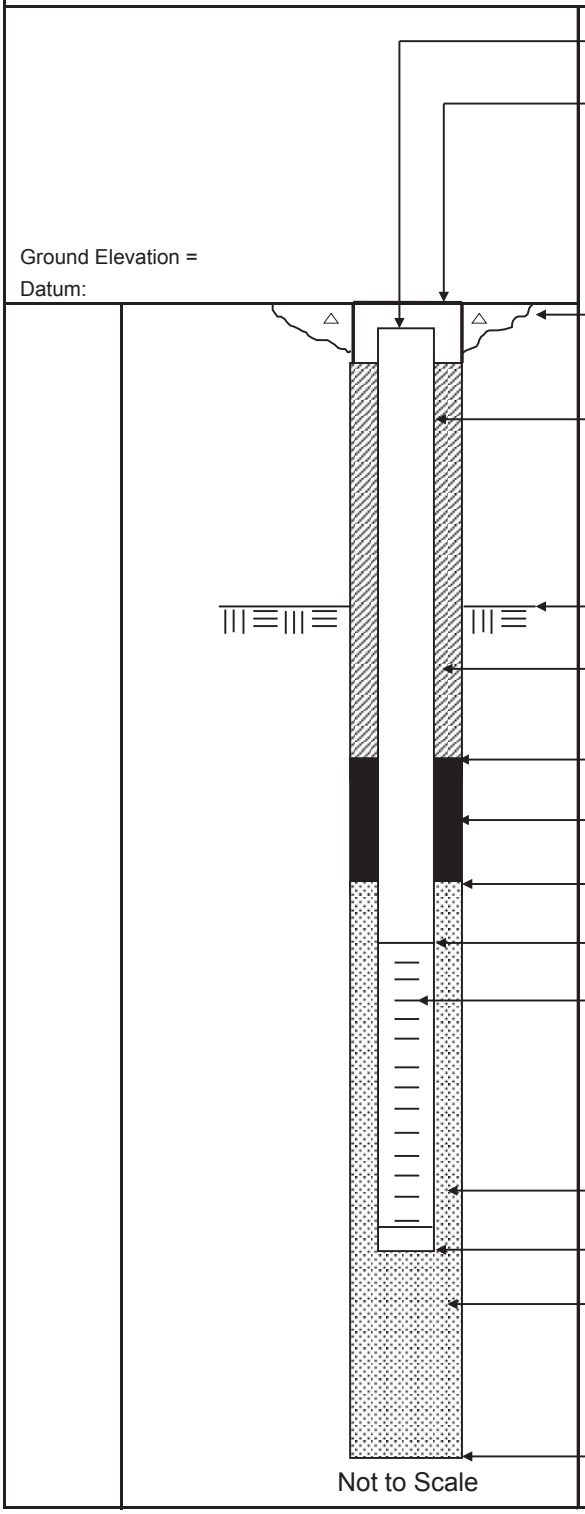
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0093
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/15/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

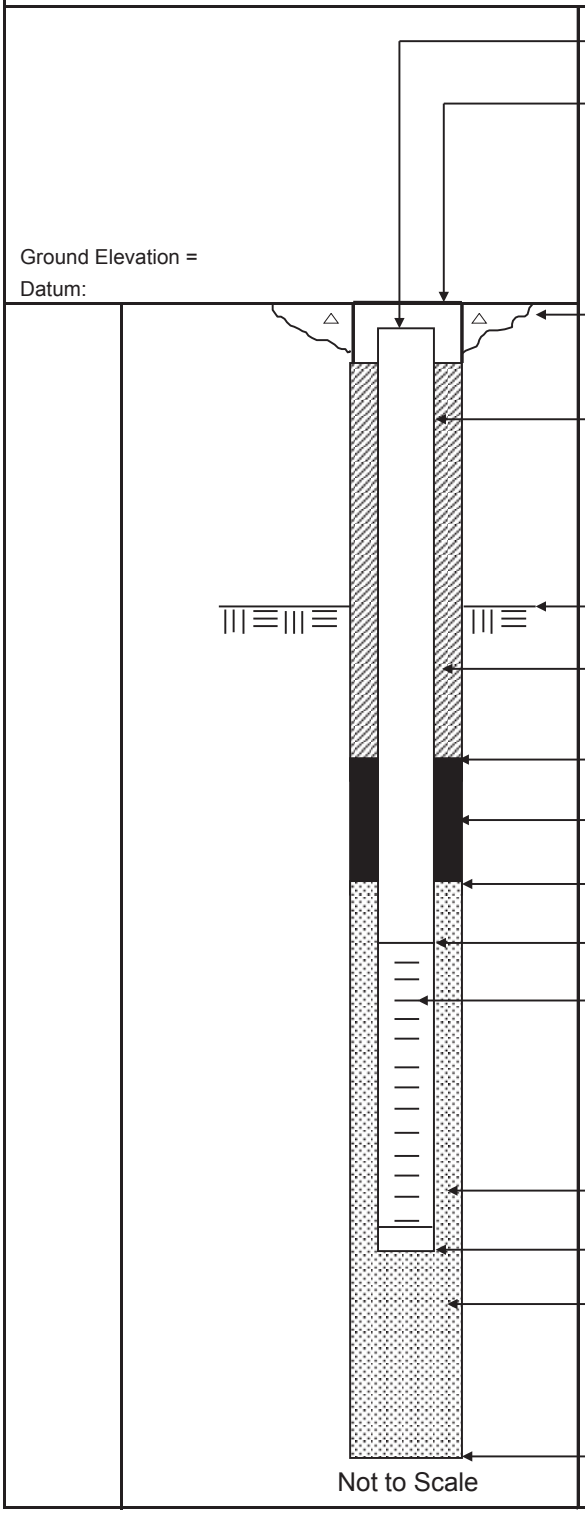
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0094
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/12/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

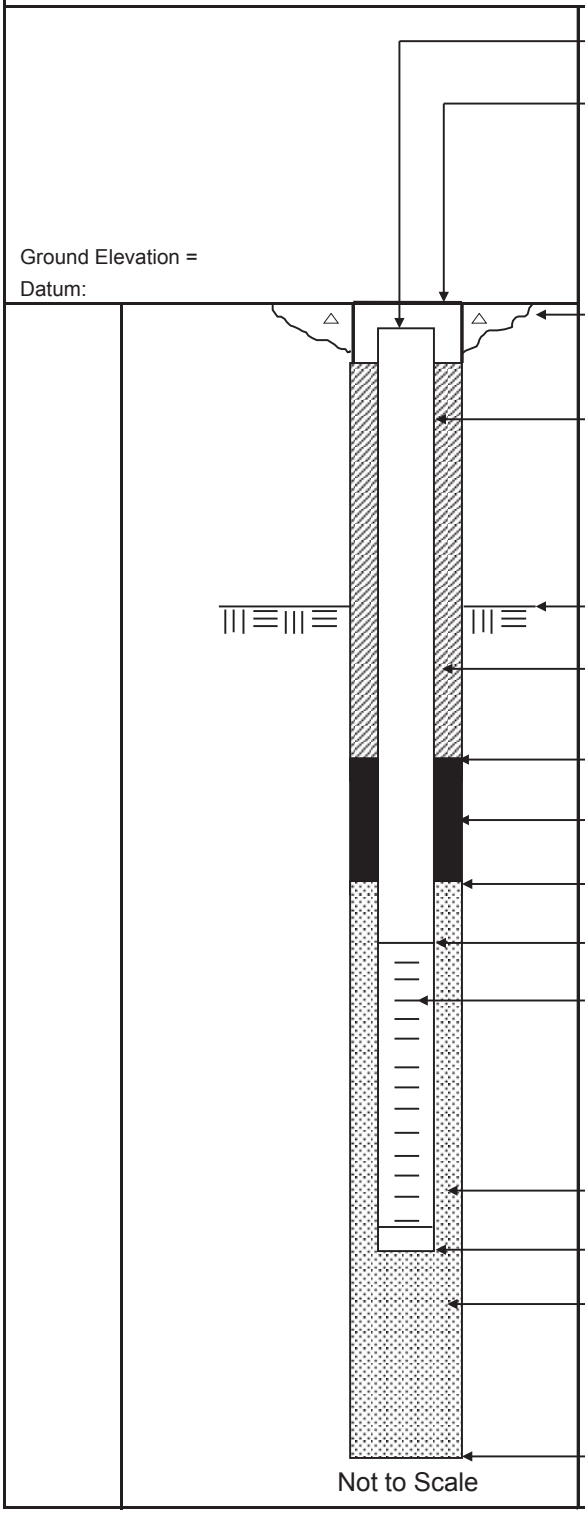
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0095
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

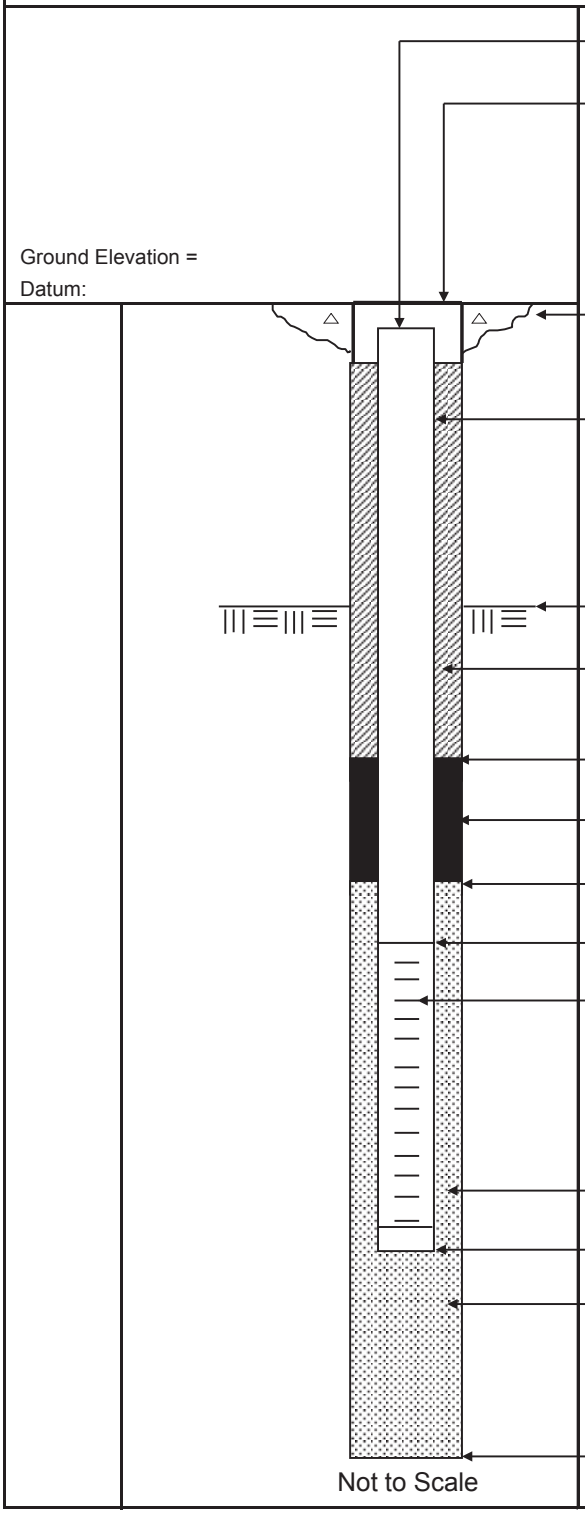
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0096
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

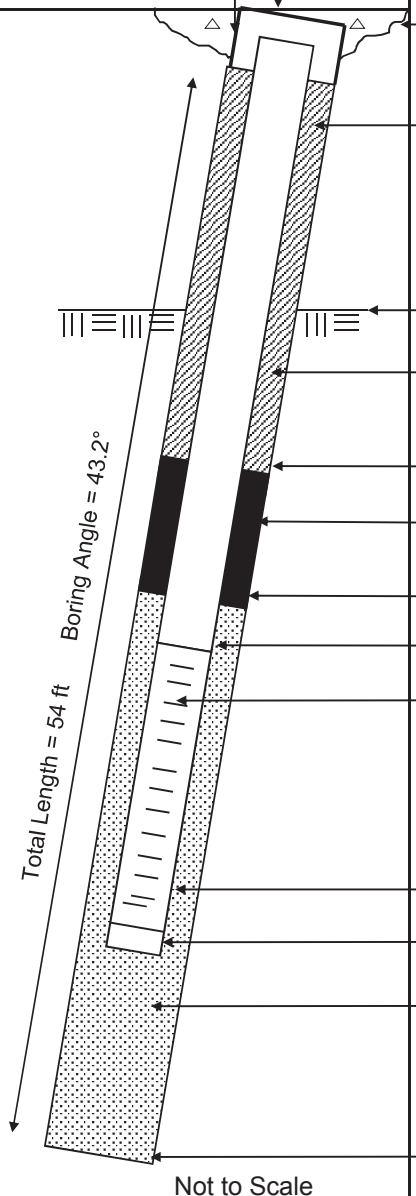
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 43.2 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0097
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/14/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

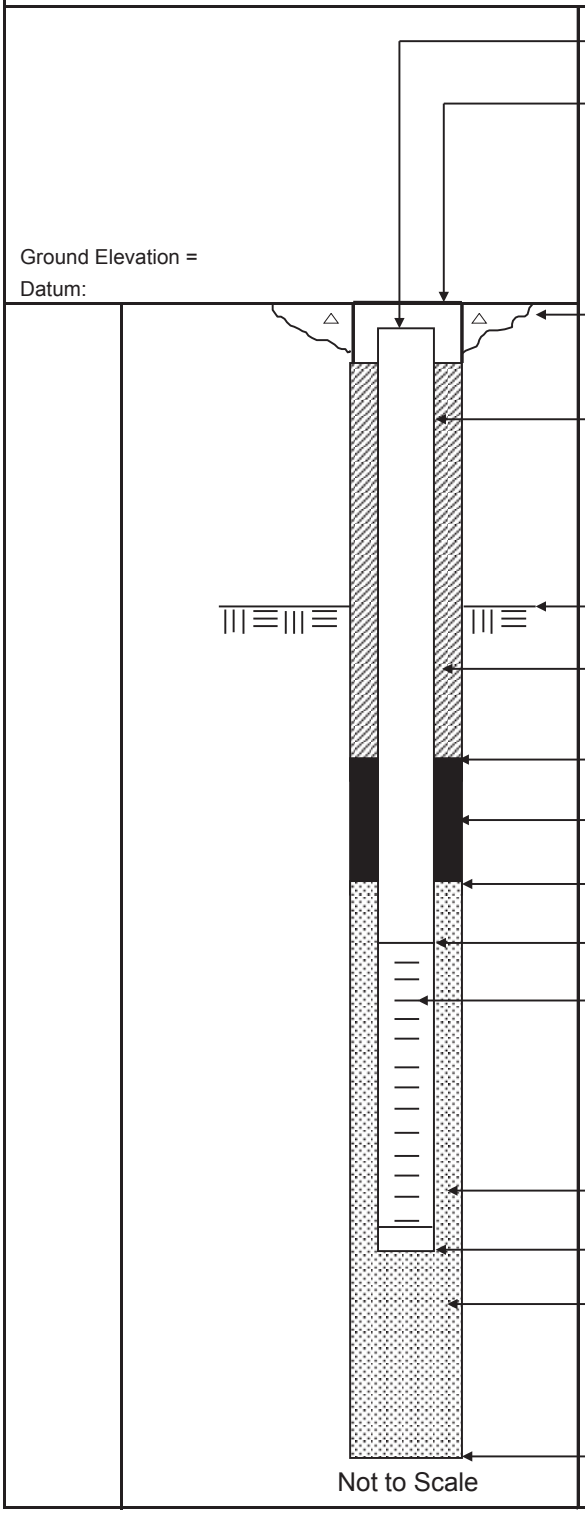
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0098
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/12/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

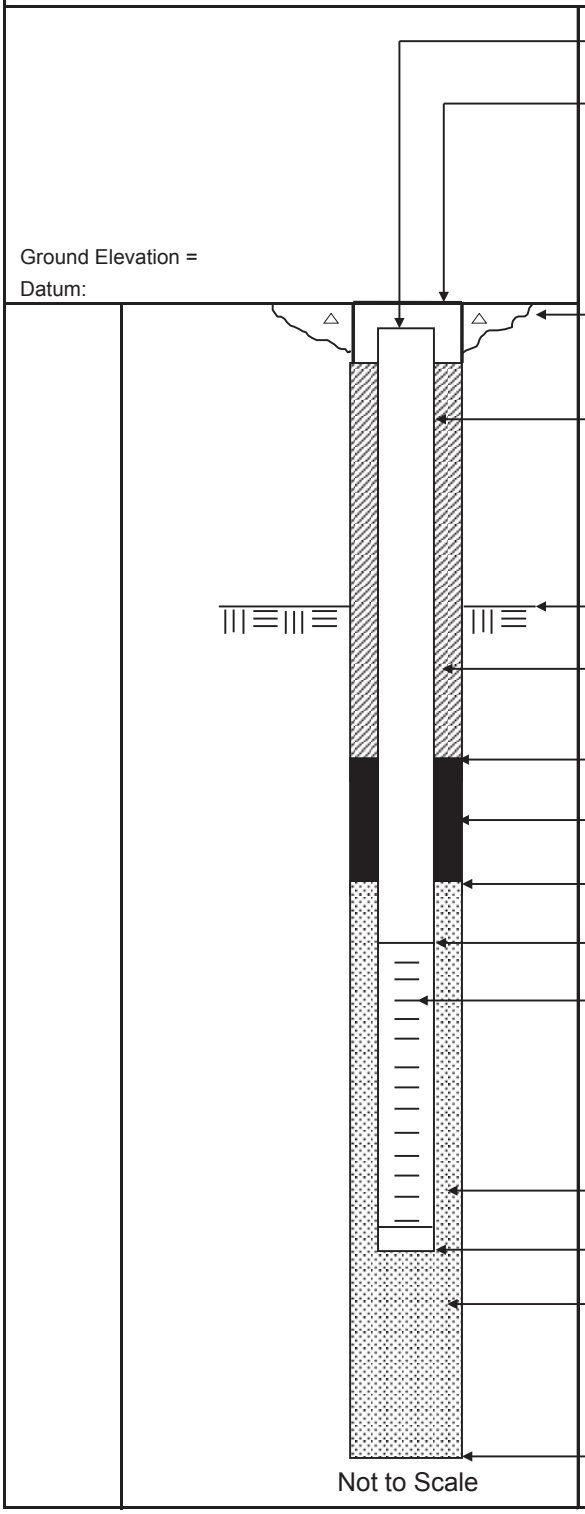
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0099
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

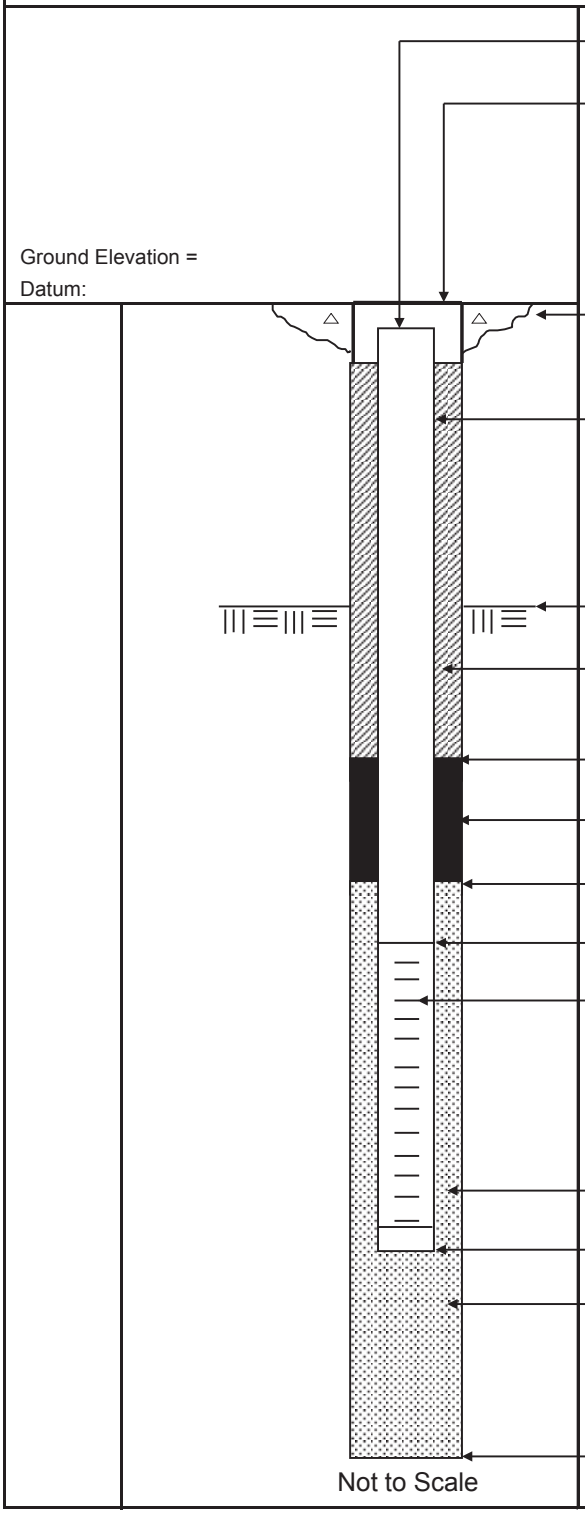
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0100
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/12/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

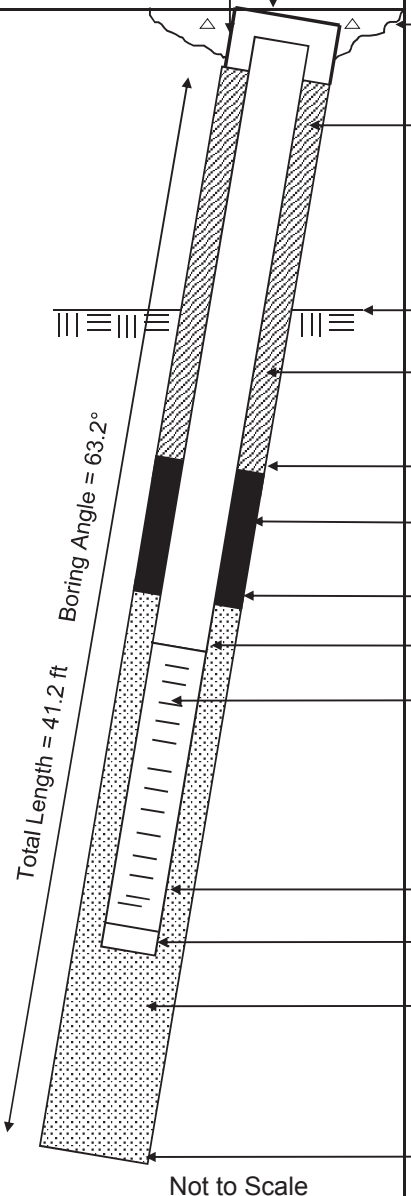
Type of Backfill Below Well: Bentonite

Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc. Angle 63.2 Degree BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0101
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/14/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well:

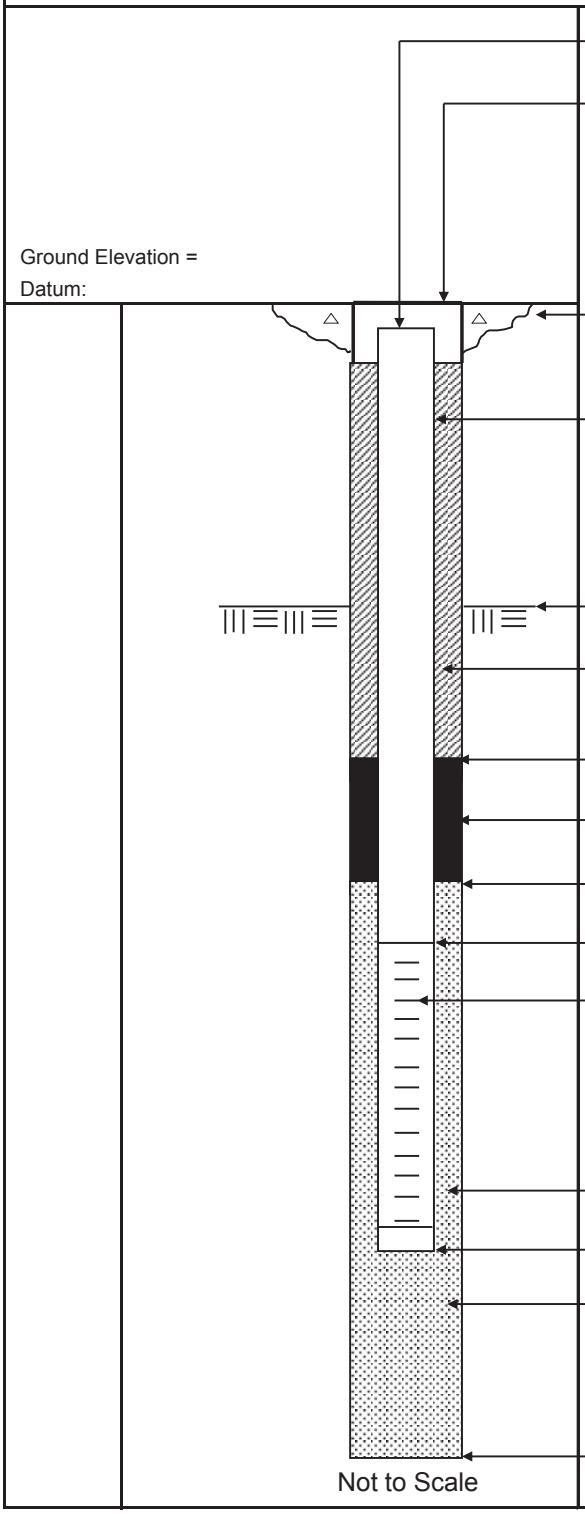
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0102
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/12/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

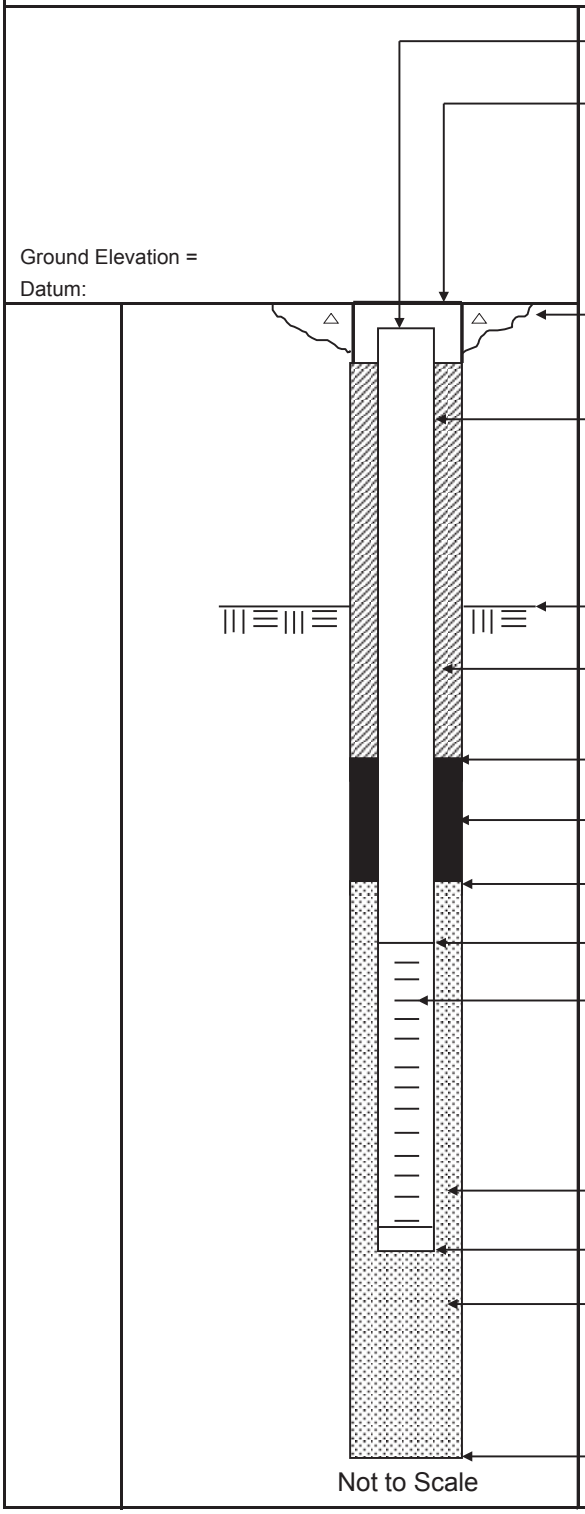
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0103
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

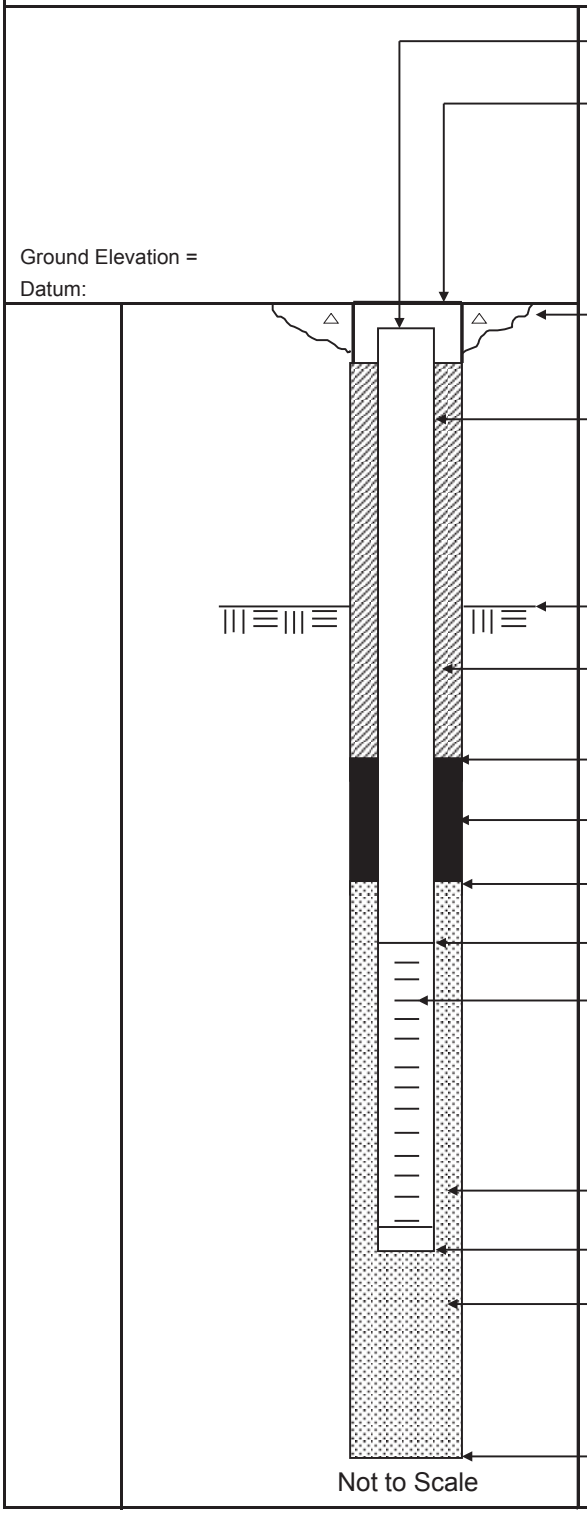
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0104
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/12/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

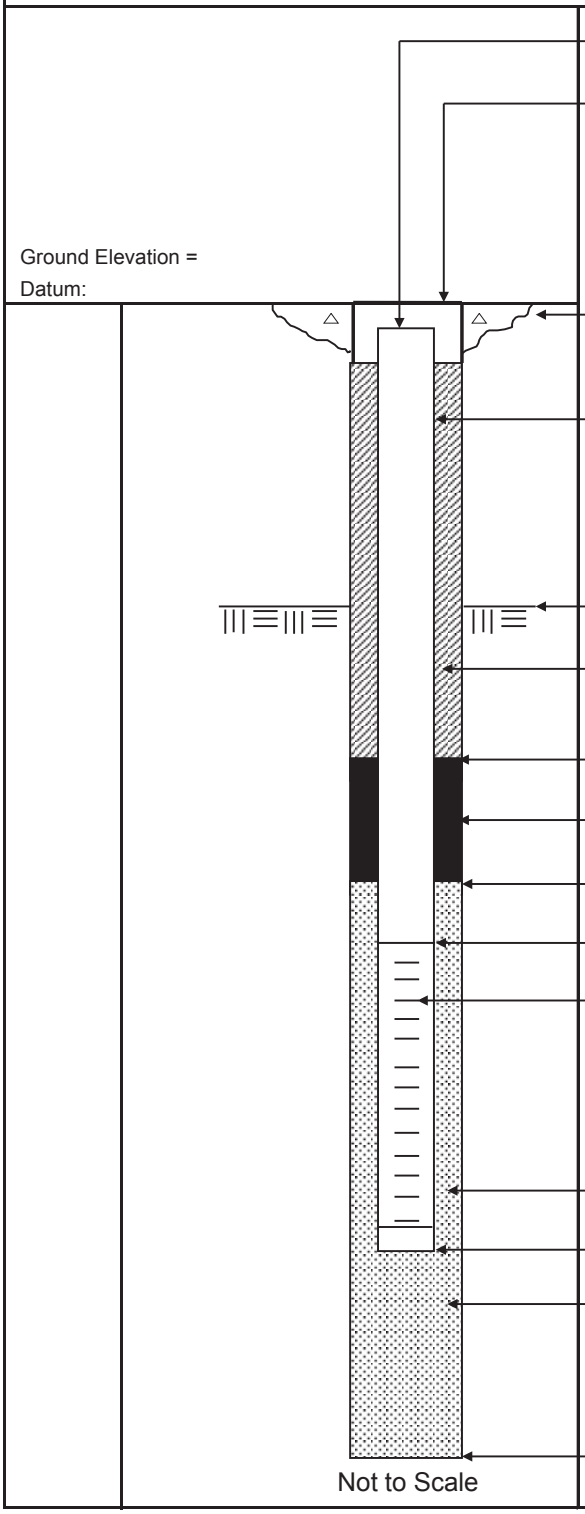
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0105
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/12/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

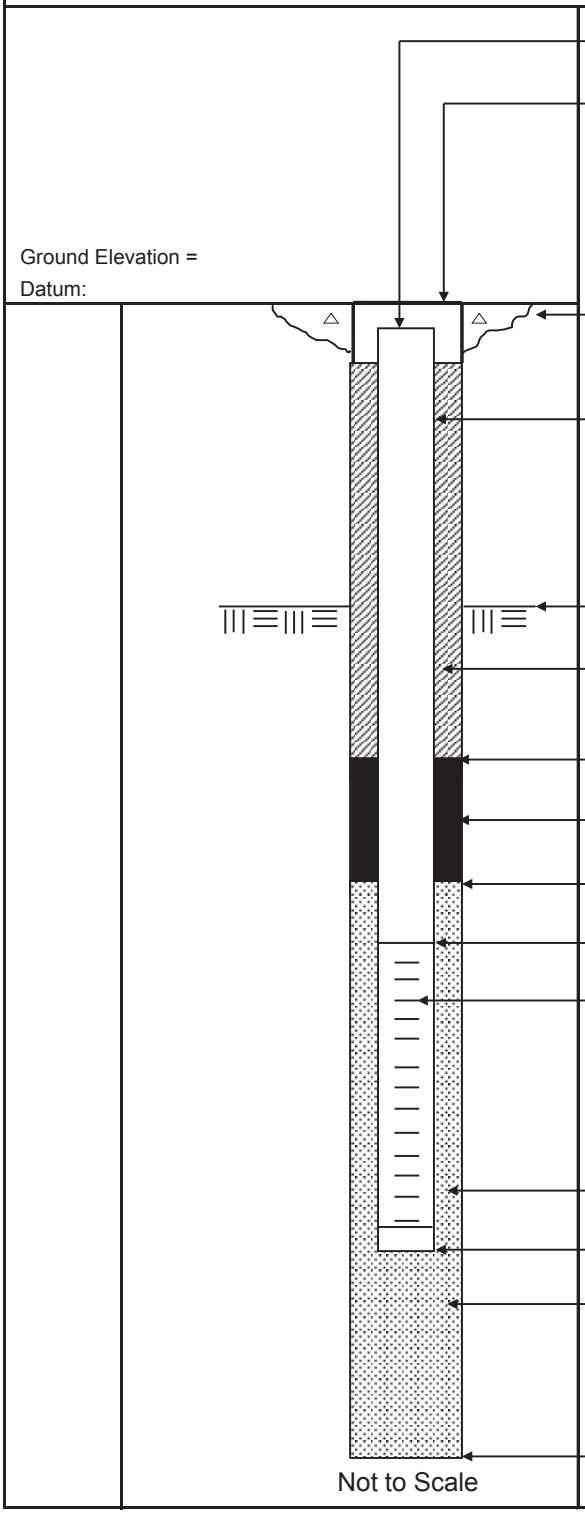
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0106
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/12/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

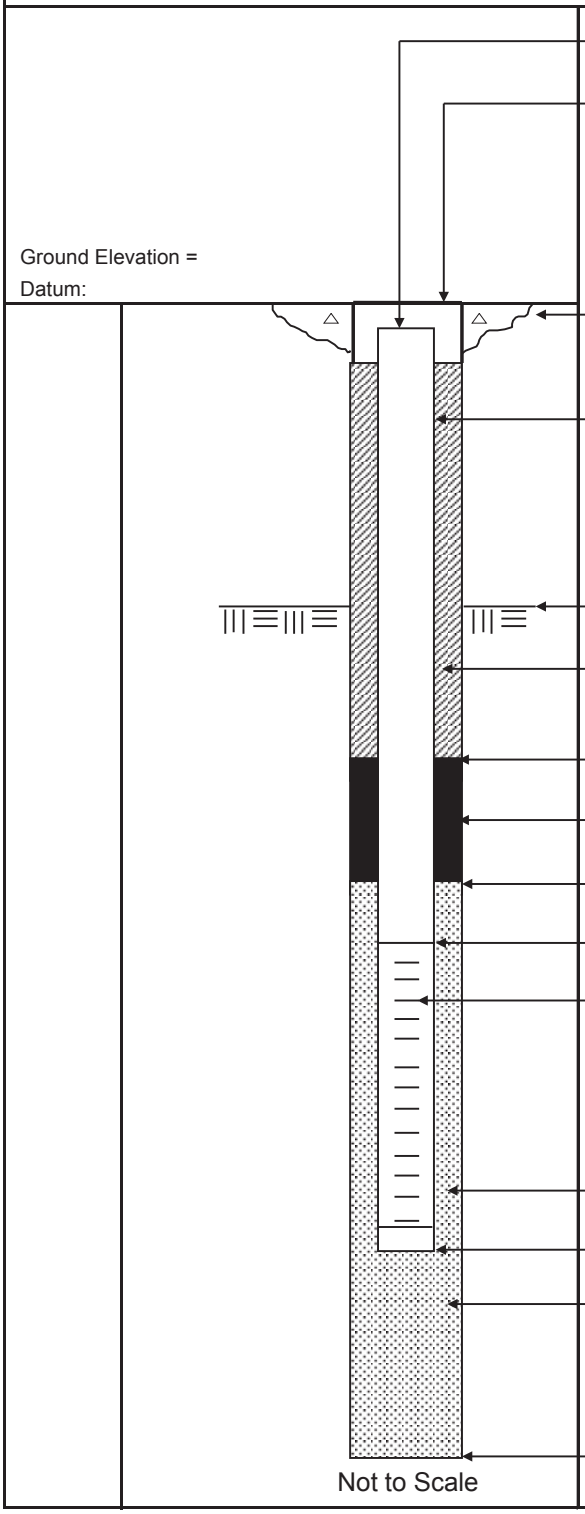
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0107
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

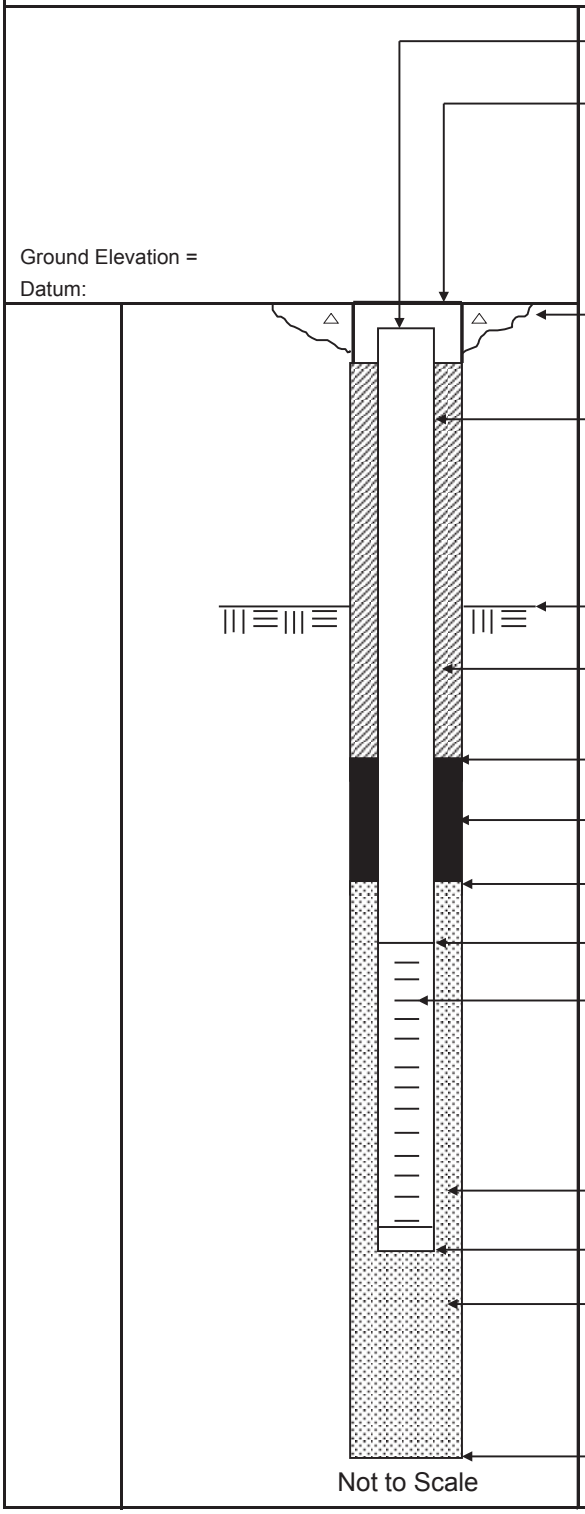
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0108
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/12/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

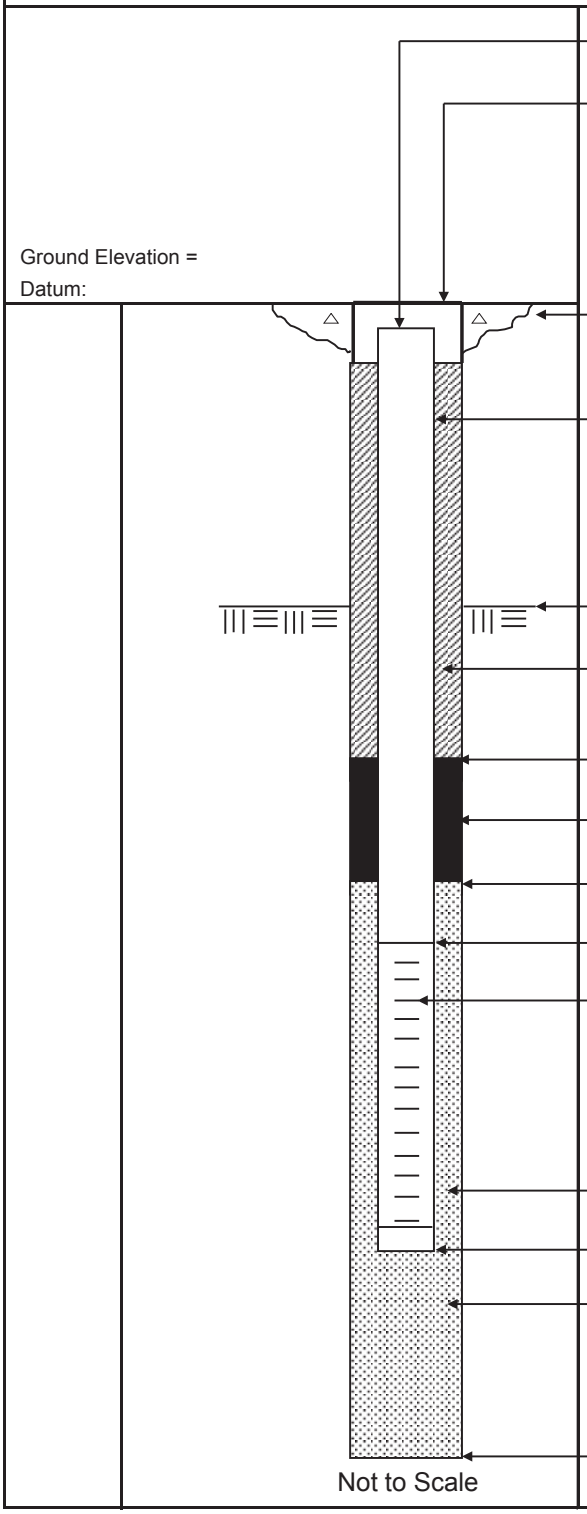
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0109
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

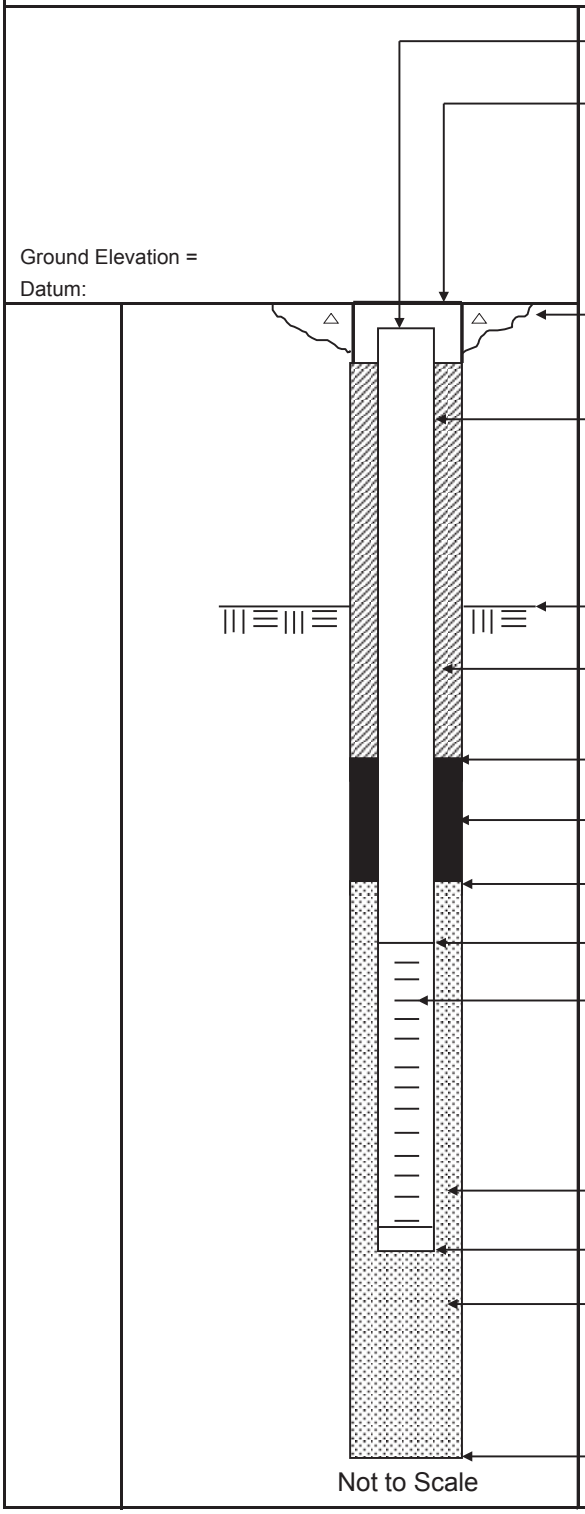
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0110
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

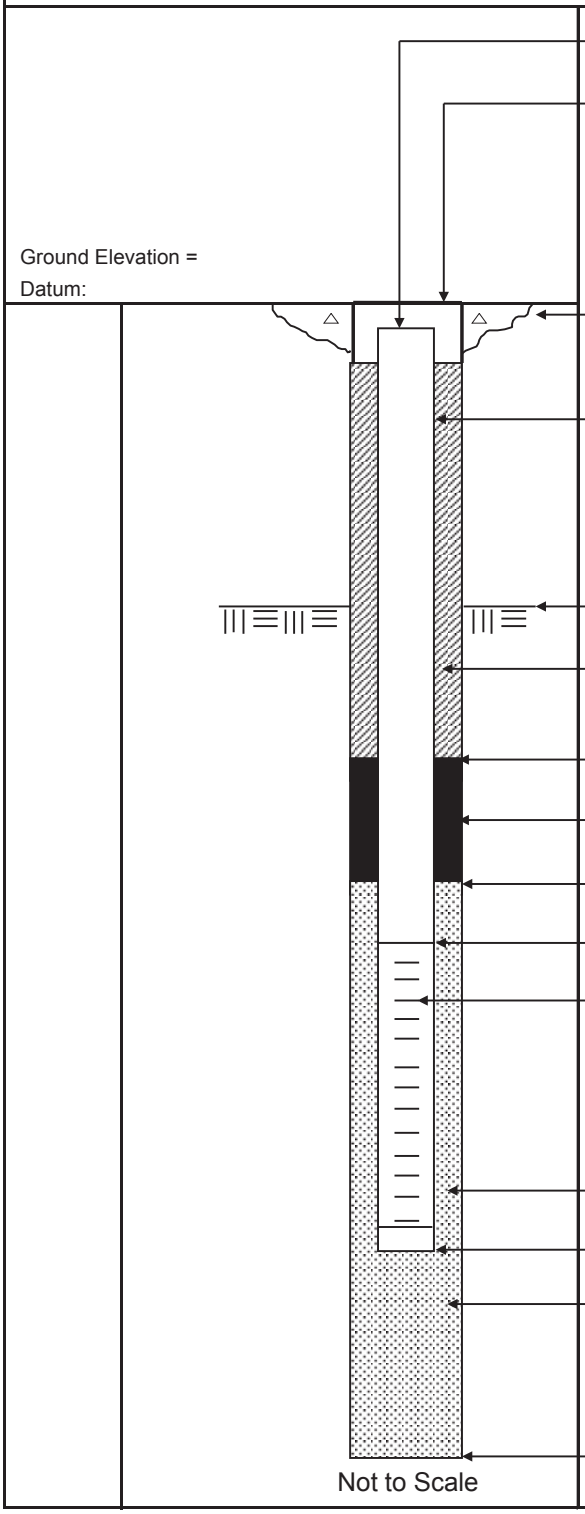
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0111
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

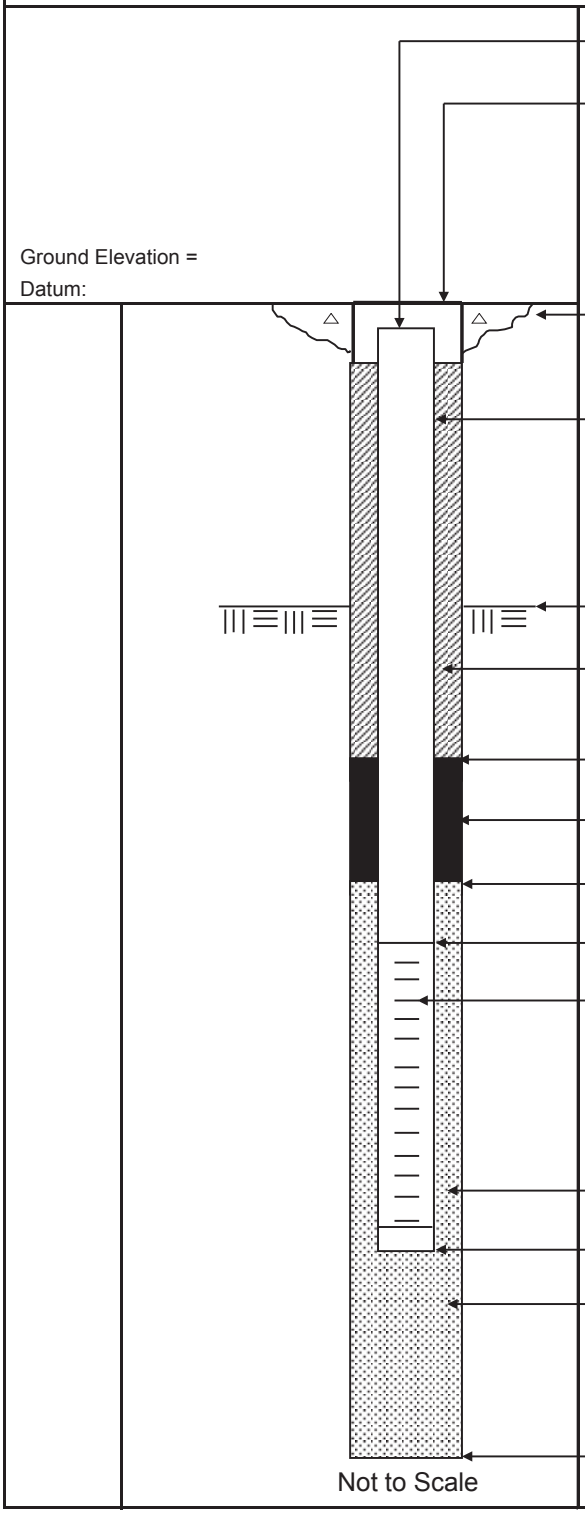
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0112
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

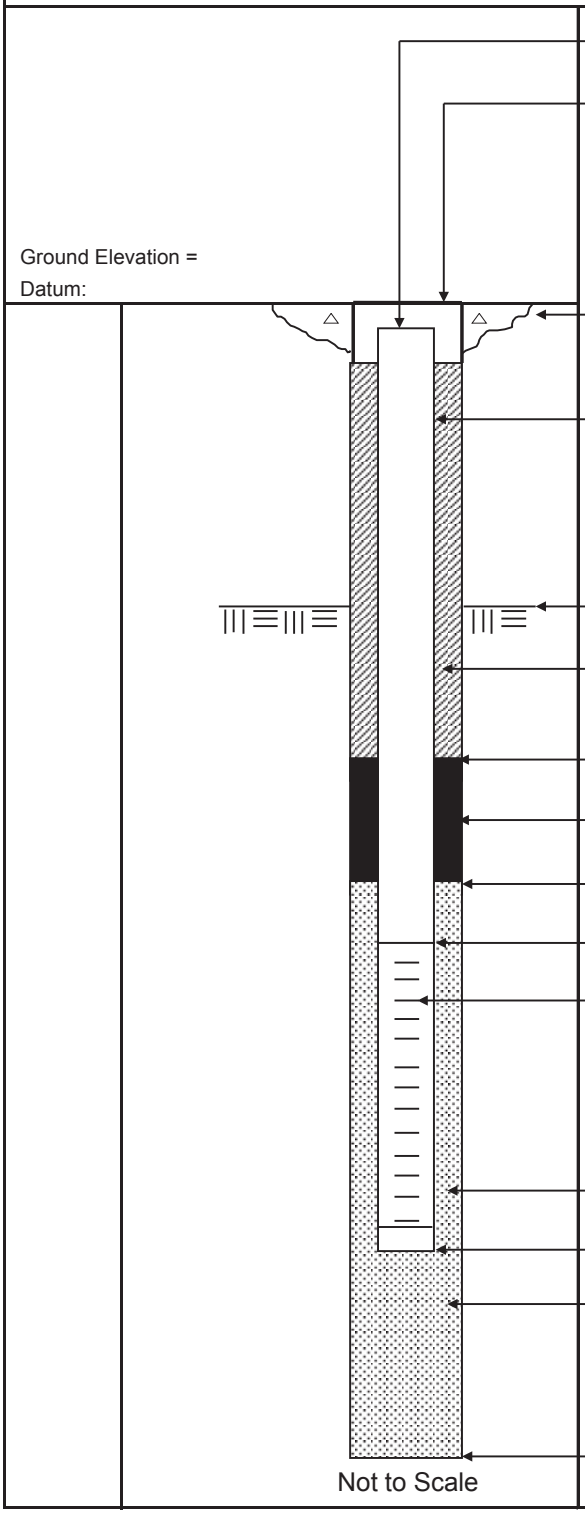
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0113
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

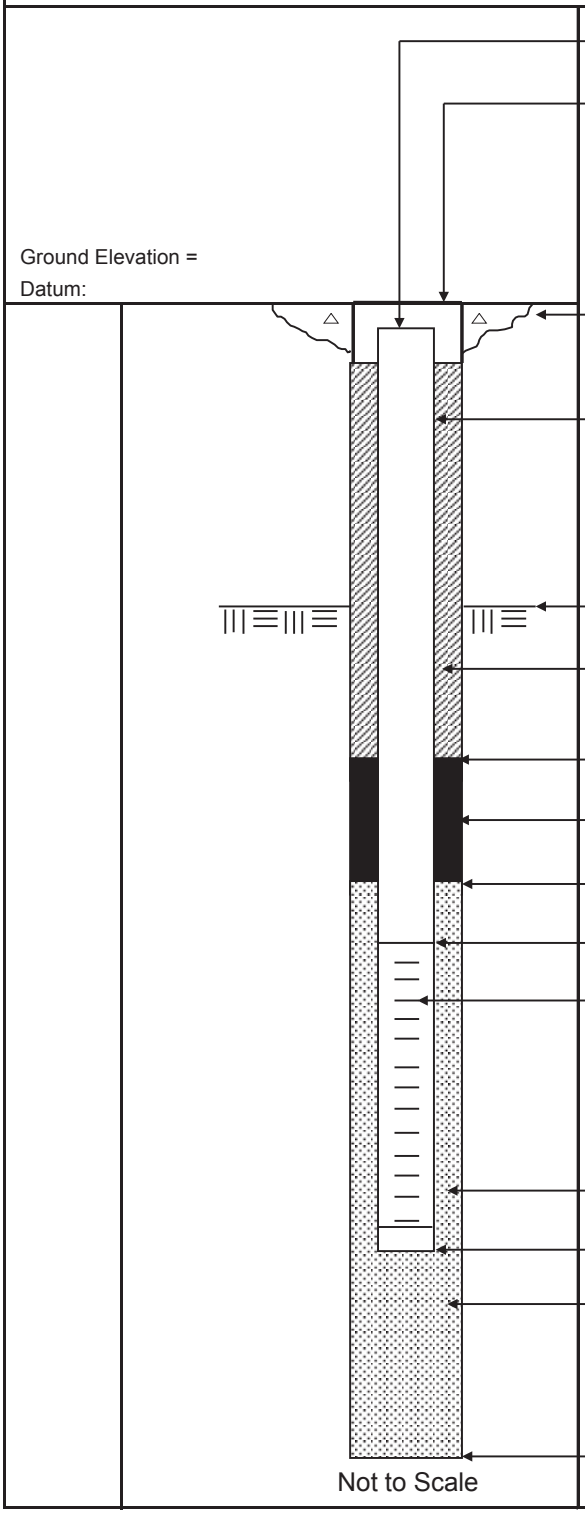
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0114
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

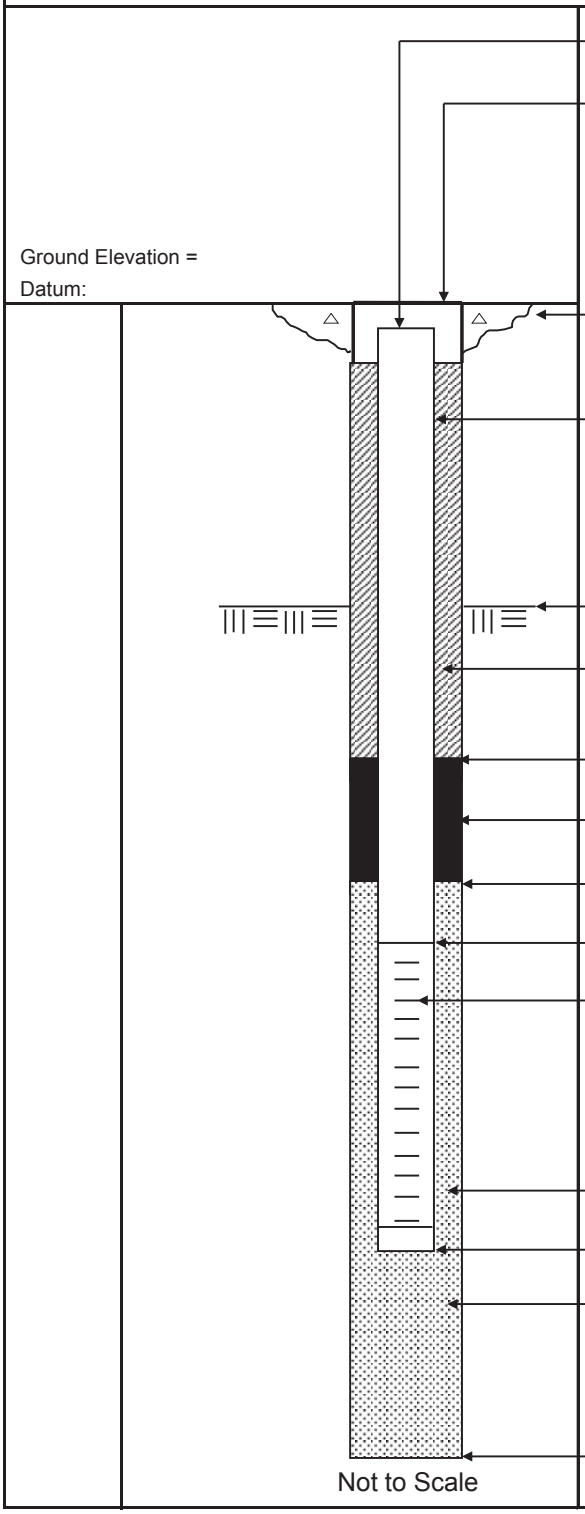
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0115
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/13/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

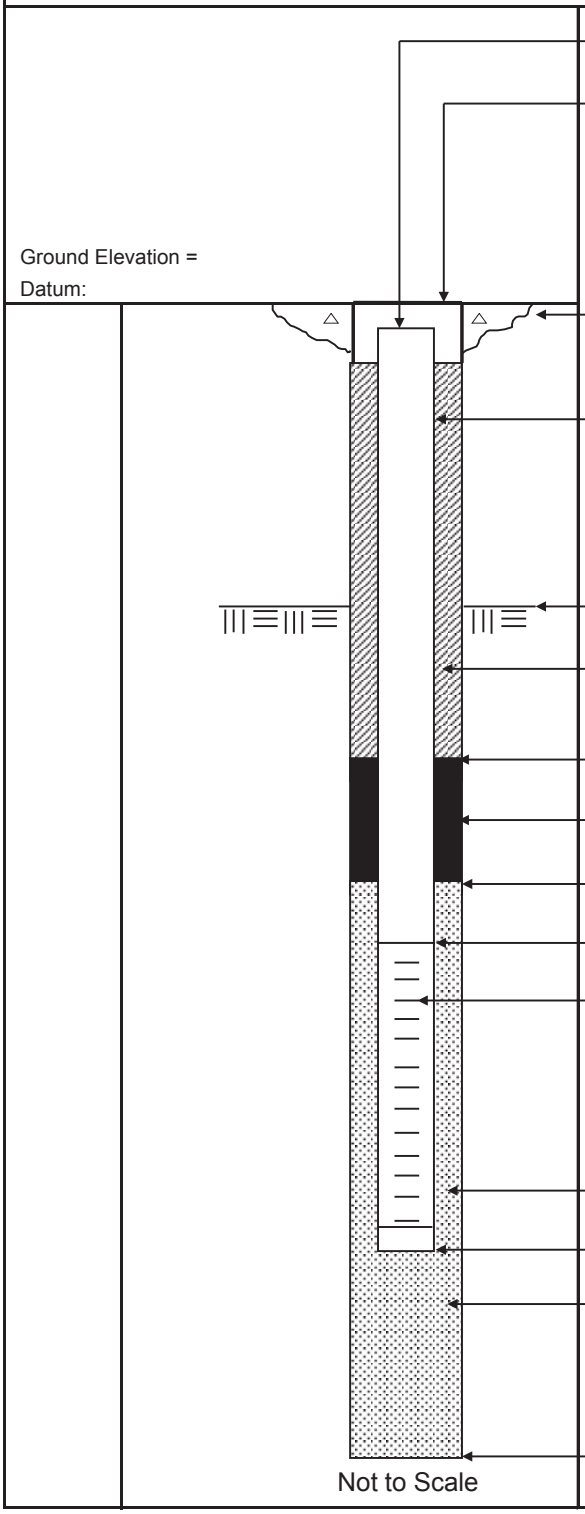
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0116
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/18/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

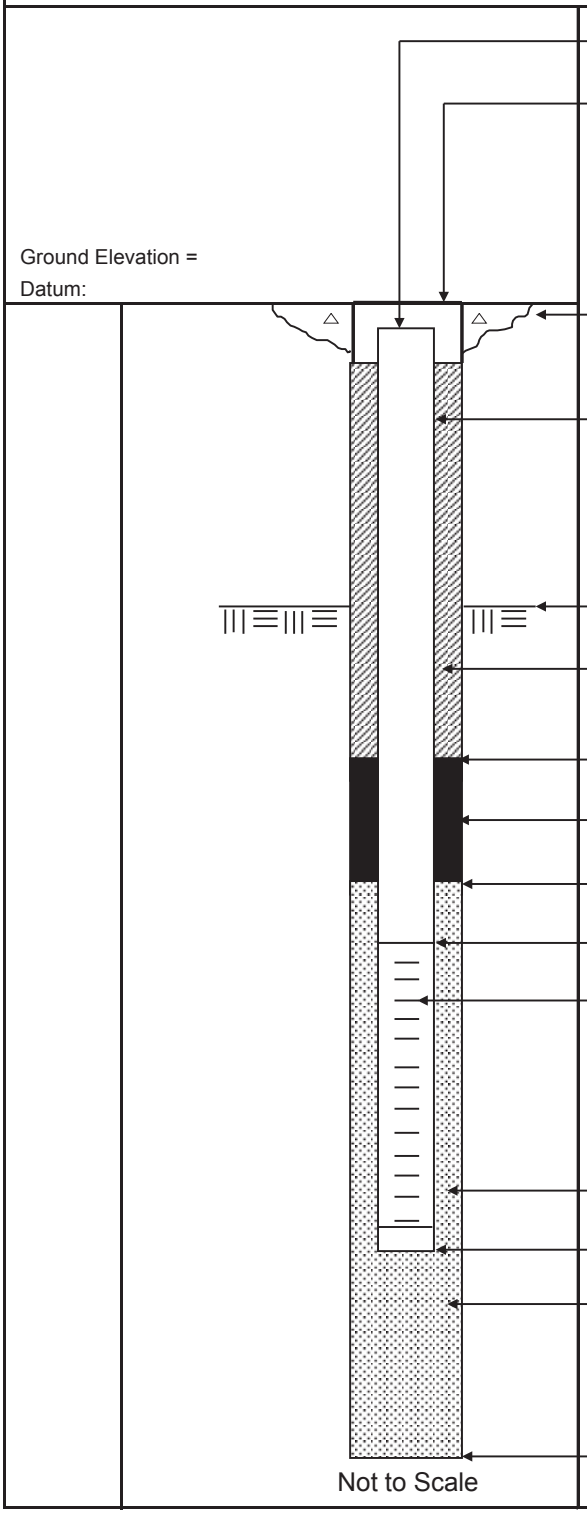
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0117
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/15/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

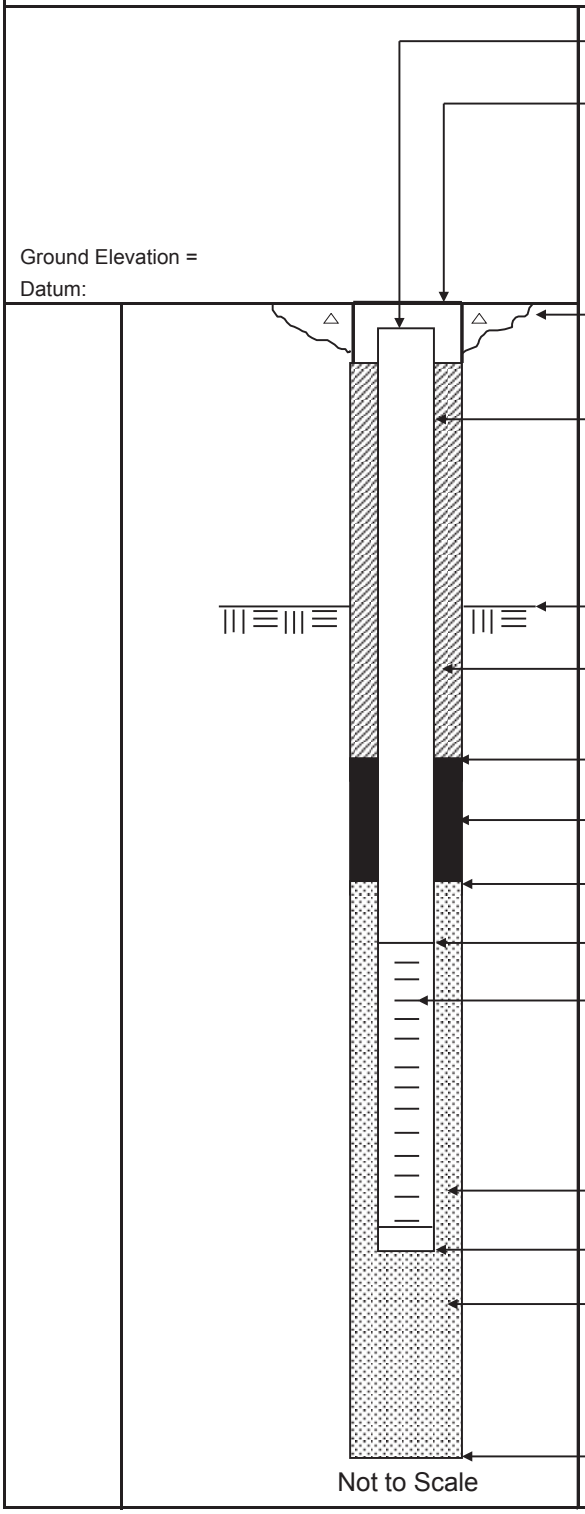
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0118
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/14/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

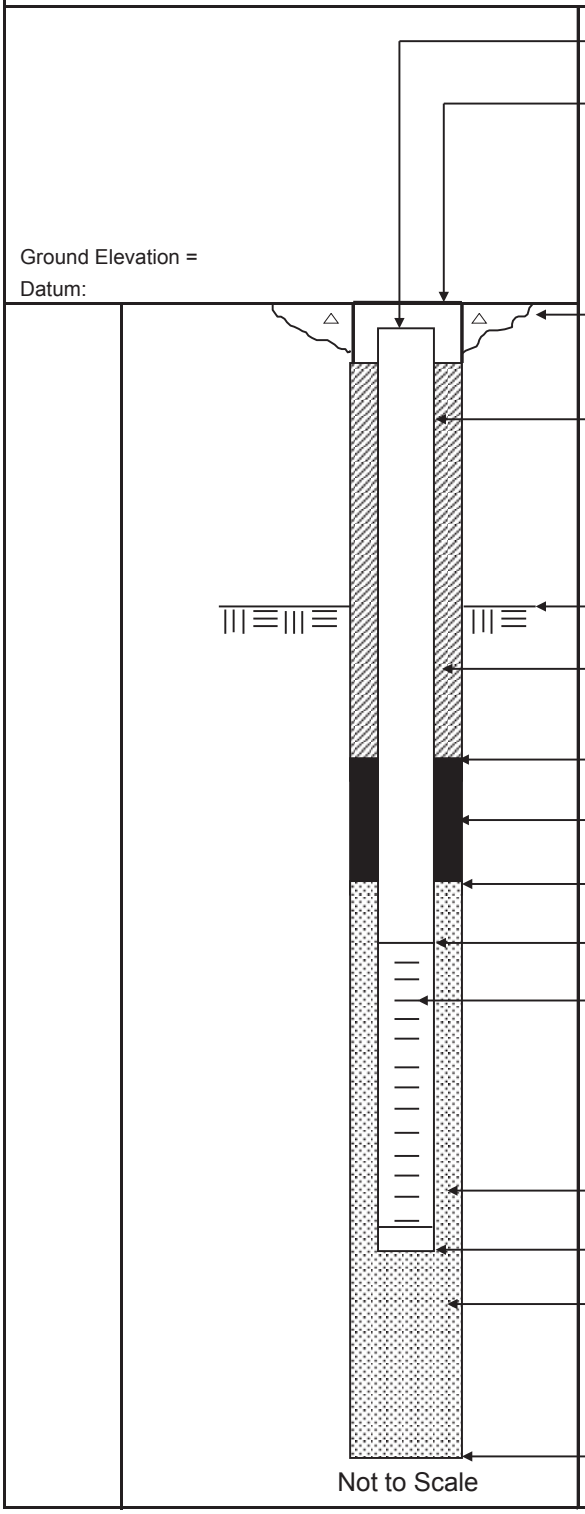
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0119
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/15/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

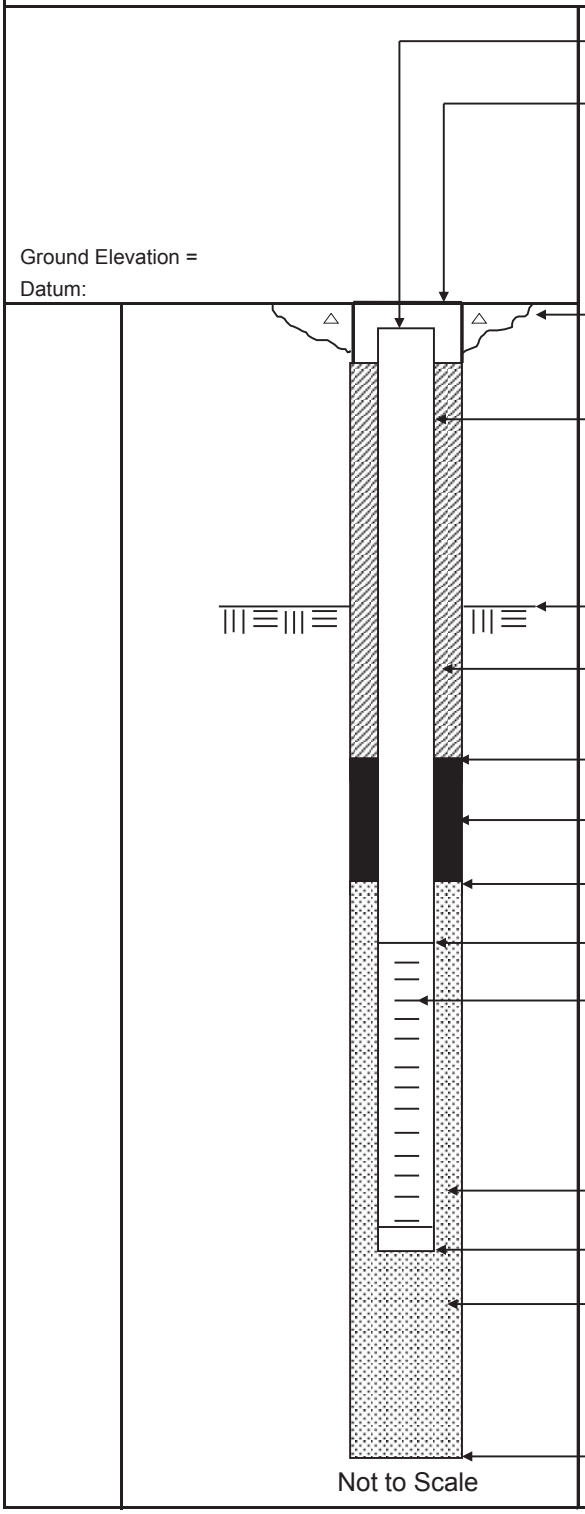
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0120
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/14/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

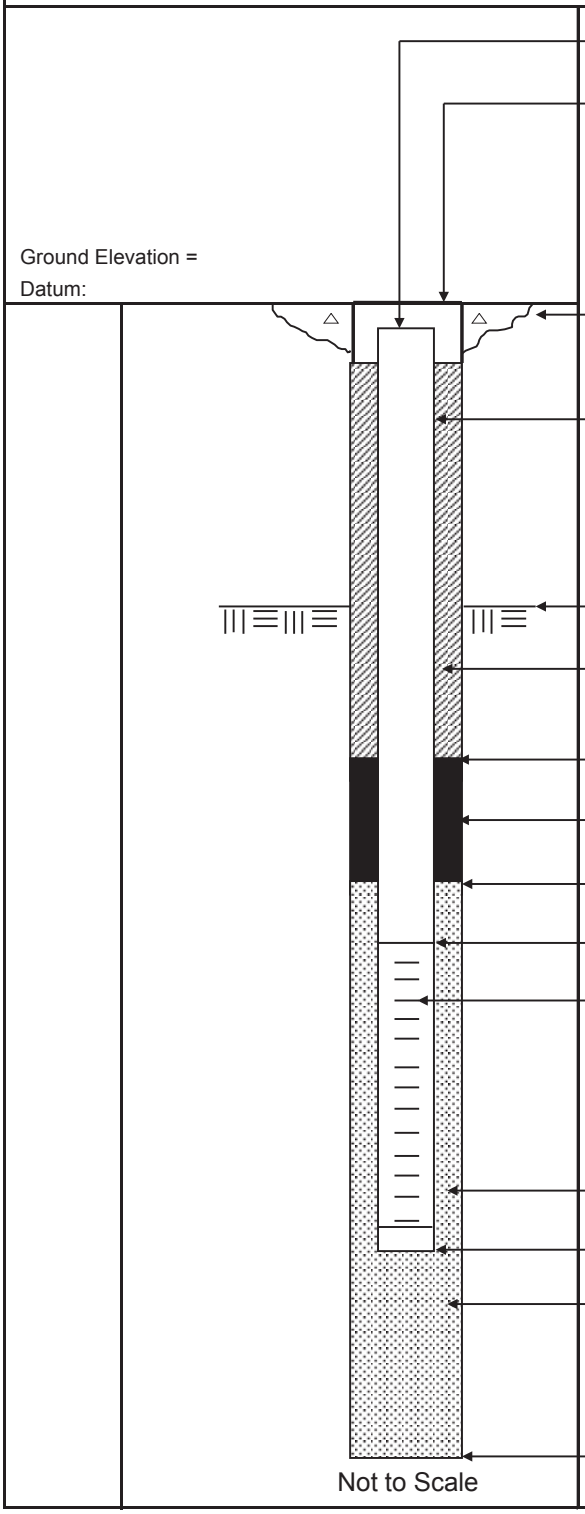
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0121
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/14/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch

casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

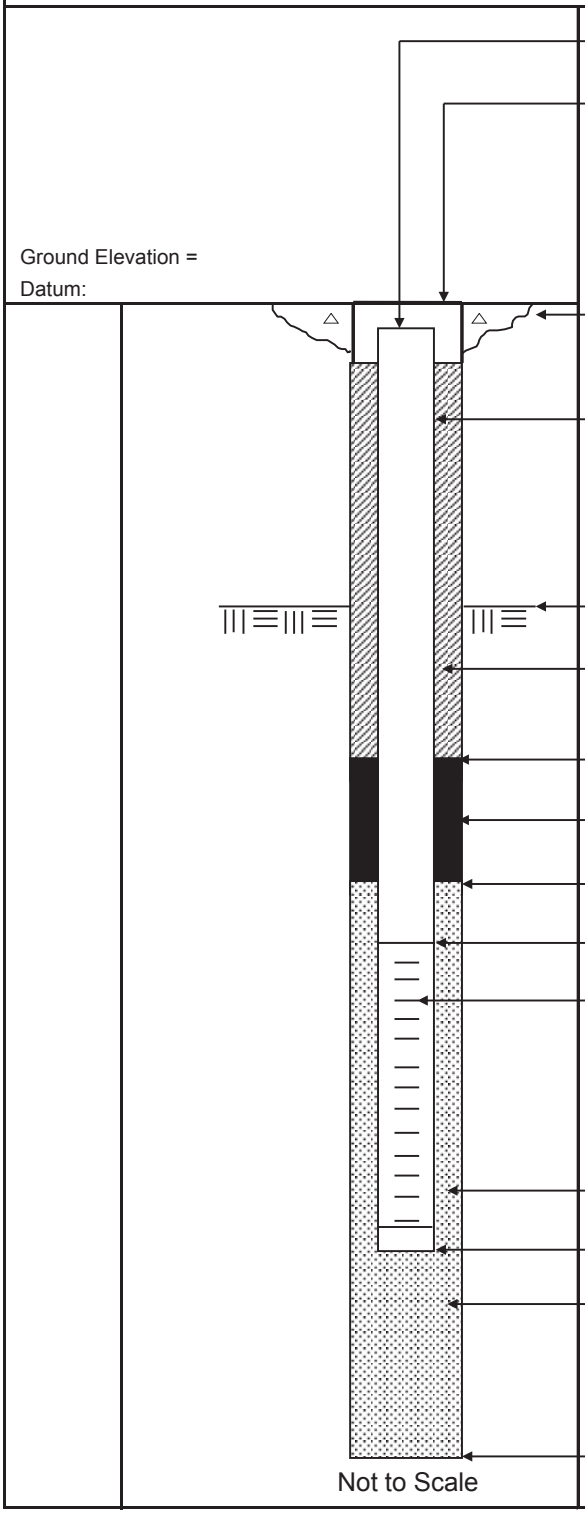
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.:

AIR SPARGING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	AS0122
PROJECT No.:	112G06925	DRILLER:	B. Moss	DATE COMPLETED:	08/15/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: / 0

I.D. of Surface Casing:

Type of Surface Casing:

Type of Surface Seal: Cement

I.D. of Riser: 1"

Type of Riser: PVC

Borehole Diameter: 4 Inch
casing to foot depth

Elevation / Depth Top of Rock: / NA

Type of Seal: Portland Cement Grout

Elevation / Depth of Seal: / 31.5

Type of Seal: Bentonite

Elevation / Depth of Top of Filter Pack: / 34.5

Elevation / Depth of Top of Diffuser: / 35.0

Type of Diffuser: Schumasoil

Slot Size x Length: 1" x 20" x 50 Micron

I.D. of Diffuser: 1"

Type of Filter Pack: 20/30 Filter Sand

Elevation / Depth of Bottom of Diffuser: / 37.0

Elevation / Depth of Bottom of Filter Pack: / 37.0

Type of Backfill Below Well: Bentonite

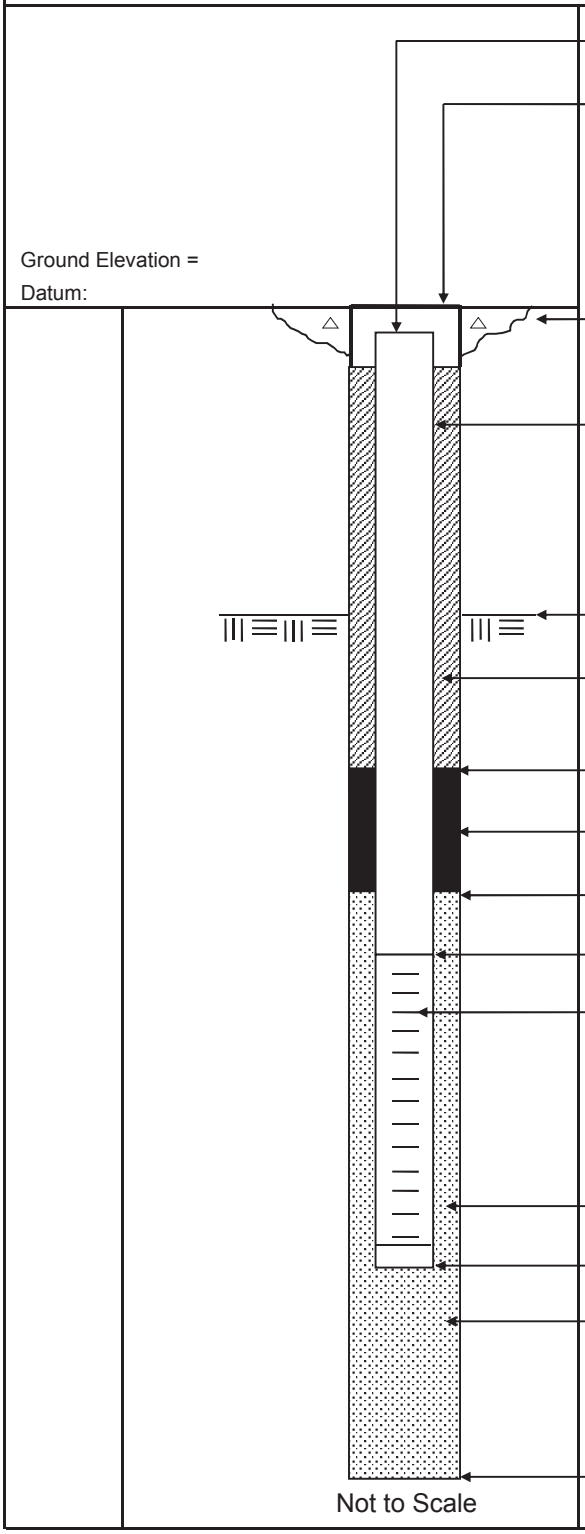
Elevation / Total Depth of Borehole: / 37.0

Tetra Tech, Inc.

BORING No.: MW-A

MONITORING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	MW0031I
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



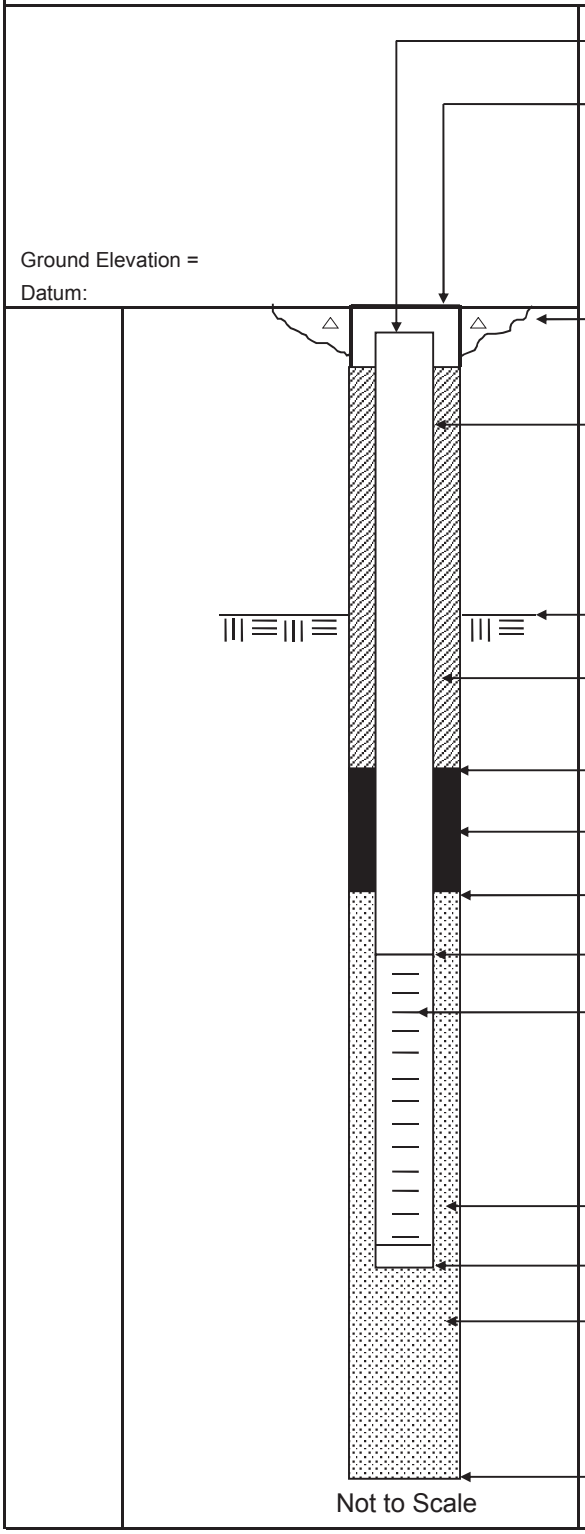
Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/ 0
I.D. of Surface Casing:		
Type of Surface Casing:		
Type of Surface Seal:	Cement	
I.D. of Riser:	1"	
Type of Riser:	PVC	
Borehole Diameter:	2 Inch with 4 inch outer casing to foot depth	
Elevation / Depth Top of Rock:		/ NA
Type of Seal:	Portland Cement Grout	
Elevation / Depth of Seal:		/ 21.5
Type of Seal:	Bentonite	
Elevation / Depth of Top of Filter Pack:		/ 22.5
Elevation / Depth of Top of Screen:		/ 23.0
Type of Screen:	Schumasoil	
Slot Size x Length:	1" x 24 "	
I.D. of Screen:	1"	
Type of Filter Pack:	20/30 Filter Sand	
Elevation / Depth of Bottom of Screen:		/ 28.0
Elevation / Depth of Bottom of Filter Pack:		/ 28.0
Type of Backfill Below Well:		
Elevation / Total Depth of Borehole:		/ 28.0

Tetra Tech, Inc.

BORING No.: MW-B

MONITORING WELL SHEET with FLUSHMOUNT COMPLETION

PROJECT:	NASA-KSC	DRILLING Co.:	DrillPro	Well No:	MW0032I
PROJECT No.:	112G06925	DRILLER:	D. Longino	DATE COMPLETED:	08/21/14
SITE:	LC39A	DRILLING METHOD:	RotoSonic	NORTHING:	
GEOLOGIST:	C. Sorden	DEV. METHOD:	Pump	EASTING:	



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/ 0
I.D. of Surface Casing:		
Type of Surface Casing:		
Type of Surface Seal:	Cement	
I.D. of Riser:	1"	
Type of Riser:	PVC	
Borehole Diameter:	2 Inch with 4 inch outer casing to foot depth	
Elevation / Depth Top of Rock:		/ NA
Type of Seal:	Portland Cement Grout	
Elevation / Depth of Seal:		/ 21.5
Type of Seal:	Bentonite	
Elevation / Depth of Top of Filter Pack:		/ 22.5
Elevation / Depth of Top of Screen:		/ 23.0
Type of Screen:	Schumasoil	
Slot Size x Length:	1" x 24 "	
I.D. of Screen:	1"	
Type of Filter Pack:	20/30 Filter Sand	
Elevation / Depth of Bottom of Screen:		/ 28.0
Elevation / Depth of Bottom of Filter Pack:		/ 28.0
Type of Backfill Below Well:		
Elevation / Total Depth of Borehole:		/ 28.0

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: DBA-IW03I	SAMPLE ID: 39A-DBA-IW0003I-035.5-201412 15 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-15-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 3.30	CASING HEIGHT (feet als): 0.40	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 3.70	WELL SCREEN INTERVAL DEPTH (feet bls):33-37	
WELL DIAMETER (inches): 2"	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 33	BOTTOM DEPTH (feet bls): 37

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.66 Liters .005 x 37 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 35.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 35.5	PURGING INITIATED AT: 0935	PURGING ENDED AT: 0955	TOTAL VOLUME PURGED (Liters): 2L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
0945	1L	1L	100	3.63	7.23	22.32	40.76	2.16	2.29	-240	clear
0950	.5L	1.5L	100	3.65	7.23	22.70	40.73	2.36	1.70	-254	clear
0955	.5L	2L	100	3.65	7.23	22.90	40.69	2.47	1.52	-258	clear
1000	SAMPLE	collected									

WELL CAPACITY (Liters Per Foot): 0.75" = 0.076; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURES:	SAMPLING INITIATED AT: 1000	SAMPLING ENDED AT: 1005
MARK Mengel / NUS	Mark L Mengel		

PUMP OR TUBING DEPTH IN WELL (feet): 35.5	SAMPLE PUMP: SM FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH		

REMARKS:

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW19S	SAMPLE ID: 39A-21ST-MW0019S-017.5-20141213 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-13-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 4.50	CASING HEIGHT (feet als): -0.3	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 4.53	WELL SCREEN INTERVAL DEPTH (feet bls): 15-20	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 15	BOTTOM DEPTH (feet bls): 20

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
.575 Liters .005 x 20 + 0.475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 17.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 17.5	PURGING INITIATED AT: 0830	PURGING ENDED AT: 0850	TOTAL VOLUME PURGED (Liters): 2L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
0840	1L	1L	100	4.70	7.80	23.85	0.877	6.57	1.61	-209	clear
0845	.5L	1.5L	100	4.75	7.76	24.11	0.885	5.65	1.21	-241	clear
0850	.5L	2.0L	100	4.72	7.76	24.06	0.895	4.00	0.87	-245	clear
0855	SAMPLE collected										

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.076; **1"** = 0.15; **1.25"** = 0.23; **2"** = 0.61; **3"** = 1.40; **4"** = 2.46; **5"** = 3.86; **6"** = 5.57; **12"** = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): **1/8"** = 0.002; **3/16"** = 0.005; **1/4"** = 0.0098; **5/16"** = 0.015; **3/8"** = 0.023; **1/2"** = 0.038; **5/8"** = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURES:	SAMPLING INITIATED AT: 0855	SAMPLING ENDED AT: 0900
Mark Mengel / NUS	Mark Mengel		
PUMP OR TUBING DEPTH IN WELL (feet): 17.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly	
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
1	3		40m	HCL		<2	VOC 8260B	

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW21S	SAMPLE ID: 39A-21ST-MW0021S-017.5-20141213 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12/13/14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 3.10	CASING HEIGHT (feet als): -0.3	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 3.13	WELL SCREEN INTERVAL DEPTH (feet bls): 15-20	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 15	BOTTOM DEPTH (feet bls): 20

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: **1 EQUIPMENT VOL.** = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.575 Liters .005 x 20 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 17.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 17.5	PURGING INITIATED AT: 0915	PURGING ENDED AT: 0935	TOTAL VOLUME PURGED (Liters): 2L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
0925	1L	1L	100	3.25	7.70	22.95	0.483	1.93	0.94	-199	clear
0930	.5L	1.5L	100	3.26	7.64	23.05	0.488	2.19	0.93	-186	clear
0935	.5L	2L	100	3.27	7.64	23.16	0.492	1.82	0.47	-187	clear
0940	sample collected										

WELL CAPACITY (Liters Per Foot): 0.75" = 0.076; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURES:	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
MARK mengel / NUS	Mark L Mengel	0940	0945

PUMP OR TUBING DEPTH IN WELL (feet): 17.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH		

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW18S	SAMPLE ID: 39A-21ST-MW0018S-015.5-20141213 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-13-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 3.63	CASING HEIGHT (feet als): -0.3	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 3.66	WELL SCREEN INTERVAL DEPTH (feet bls):13-18	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 13	BOTTOM DEPTH (feet bls): 18

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.575 Liters .005 x 20 + 0.475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 15.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 15.5	PURGING INITIATED AT: 1000	PURGING ENDED AT: 1025	TOTAL VOLUME PURGED (Liters): 2.5L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
1010	1L	1L	100	4.22	7.62	23.47	0.466	1.92	40.4	-149	cloudy
1015	.5L	1.5L	100	4.22	7.60	23.57	0.466	1.79	27.6	-143	cloudy
1020	.5L	2L	100	4.24	7.62	23.76	0.469	1.79	21.1	-145	cloudy
1025	.5L	2.5L	100	4.24	7.62	24.03	0.474	1.62	13.7	-143	clear
1030	SAMPLE collected										

WELL CAPACITY (Liters Per Foot): 0.75" = 0.076; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURES:	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
MARK Mengel / NUS	Mark L Mengel	1030	1035

PUMP OR TUBING DEPTH IN WELL (feet): 15.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH		

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

SITE NAME: LC39A		SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW17S	SAMPLE ID: 39A-21ST-MW0017S-016.5-20141213 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)		DATE: 12-13-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 5.05	CASING HEIGHT (feet als): -0.2	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 5.07	WELL SCREEN INTERVAL DEPTH (feet bls): 14-19	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 14	BOTTOM DEPTH (feet bls): 19

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.575 Liters .005 X 20 + 0.475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 16.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 16.5	PURGING INITIATED AT: 1055	PURGING ENDED AT: 1115	TOTAL VOLUME PURGED (Liters): 2 L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
1105	1 L	1 L	100	5.33	7.77	24.19	0.521	2.56	6.28	-207	clear
1110	.5L	1.5L	100	5.35	7.86	24.35	0.522	1.59	4.92	-243	clear
1115	.5L	2.L	100	5.35	7.88	24.28	0.522	1.76	5.07	-248	clear
1120	SAMPLE COLLECTED										

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.076; **1"** = 0.15; **1.25"** = 0.23; **2"** = 0.61; **3"** = 1.40; **4"** = 2.46; **5"** = 3.86; **6"** = 5.57; **12"** = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): **1/8"** = 0.002; **3/16"** = 0.005; **1/4"** = 0.0098; **5/16"** = 0.015; **3/8"** = 0.023; **1/2"** = 0.038; **5/8"** = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: MARK Mengel / NVS	SAMPLER(S) SIGNATURES: Mark L Mengel	SAMPLING INITIATED AT: 1120	SAMPLING ENDED AT: 1125
PUMP OR TUBING DEPTH IN WELL (feet): 16.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly	
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW17I	SAMPLE ID: 39A-21ST-MW0017I-032.5-201412 13 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-13-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 5.01	CASING HEIGHT (feet als): -0.3	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 5.04	WELL SCREEN INTERVAL DEPTH (feet bls):30-35	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 30	BOTTOM DEPTH (feet bls): 35

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.65 Liters 0.005 X 35 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 32.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 32.5	PURGING INITIATED AT: 1135	PURGING ENDED AT: 1155	TOTAL VOLUME PURGED (Liters): 2 L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
1145	1 L	1 L	100	5.07	7.43	23.62	18.11	3.75	4.16	-312	clear
1150	.5L	1.5L	100	5.07	7.41	23.79	18.46	5.65	2.10	-327	clear
1155	.5L	2.0L	100	5.07	7.41	23.88	18.55	6.38	1.69	-320	clear
1200	SAMPLE collected										

WELL CAPACITY (Liters Per Foot): 0.75" = 0.076; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURES:	SAMPLING INITIATED AT: 1200	SAMPLING ENDED AT: 1205
MARK MENGEL / NUS	Mark L Mengel		

PUMP OR TUBING DEPTH IN WELL (feet): 32.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW31I (MW-A)	SAMPLE ID: 39A-21ST-MW0031I-025.5-20141213 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-13-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 3.50	CASING HEIGHT (feet als): .01	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 3.51	WELL SCREEN INTERVAL DEPTH (feet bls): 23-28	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 23	BOTTOM DEPTH (feet bls): 28

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.625 Liters .005 x 30 + .475

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 25.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 25.5	PURGING INITIATED AT: 1315	PURGING ENDED AT: 1335	TOTAL VOLUME PURGED (Liters): 2L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
1325	1L	1L	100	3.57	7.95	23.40	12.84	5.42	5.74	-325	clear
1330	.5L	1.5L	100	3.57	7.82	23.26	13.26	5.43	3.77	-318	clear
1335	.5L	2.0L	100	3.57	7.78	23.05	13.28	5.84	3.25	-304	clear
1340	sample collected										

WELL CAPACITY (Liters Per Foot): 0.75" = 0.076; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURES:	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
MARK mengel / NUS	Mark J Mengel	1340	1345

PUMP OR TUBING DEPTH IN WELL (feet): 25.5	SAMPLE PUMP: SM FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly	
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH		

REMARKS:

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW32I (MW-B)	SAMPLE ID: 39A-21ST-MW0032I-025.5-201412 13 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-13-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 3.05	CASING HEIGHT (feet als): -0.2	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 3.07	WELL SCREEN INTERVAL DEPTH (feet bls): 23-28	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 23	BOTTOM DEPTH (feet bls): 28

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)

_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)

0.625 Liters 0.005 X 30 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 25.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 25.5	PURGING INITIATED AT: 1230	PURGING ENDED AT: 1250	TOTAL VOLUME PURGED (Liters): 2 L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
1240	1L	1L	100	3.10	7.75	23.33	7.448	7.23	11.32	-321	clear
1245	.5L	1.5L	100	3.10	7.72	23.05	6.626	6.77	4.63	-298	clear
1250	.5L	2.0L	100	3.10	7.71	22.97	6.552	6.69	3.82	-294	clear
1255	SAMPLE COLLECTED										

WELL CAPACITY (Liters Per Foot): 0.75" = 0.078; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURES:	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
MARK mengel / NVS	Mark 2 Mengel	1255	1300

PUMP OR TUBING DEPTH IN WELL (feet): 25.5	SAMPLE PUMP: SM FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH		

REMARKS:

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW23S	SAMPLE ID: 39A-21ST-MW0023S-017.5-20141213 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-13-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 5.12	CASING HEIGHT (feet als): -0.3	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 5.15	WELL SCREEN INTERVAL DEPTH (feet bls): 15-20	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 15	BOTTOM DEPTH (feet bls): 20

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
.575 Liters .005 x 20 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 17.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 17.5	PURGING INITIATED AT: 1500 1440	PURGING ENDED AT: 1520	TOTAL VOLUME PURGED (Liters): 2L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
1510	1L	1L	100	5.20	7.37	23.68	0.589	2.51	0.92	-231	clear
1515	.5L	1.5L	100	5.20	7.39	23.76	0.568	2.38	1.62	-204	clear
1520	.5L	2.0L	100	5.20	7.41	24.00	0.567	2.20	0.55	-177	clear
1525	SAMPLE collected										

WELL CAPACITY (Liters Per Foot): 0.75" = 0.076; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURES:	SAMPLING INITIATED AT: 1525	SAMPLING ENDED AT: 1530
MARK Mengel / NUS	Mark L Mengel		

PUMP OR TUBING DEPTH IN WELL (feet): 17.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly	
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____		DUPLICATE: Y (N)

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH		

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW23I	SAMPLE ID: 39A-21ST-MW0023I-032.5-20141213 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-13-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 5.25	CASING HEIGHT (feet als): -0.3	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 5.55	WELL SCREEN INTERVAL DEPTH (feet bls): 30-35	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 30	BOTTOM DEPTH (feet bls): 35

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.65 Liters .005 X 35 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 32.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 32.5	PURGING INITIATED AT: 1530	PURGING ENDED AT: 1550	TOTAL VOLUME PURGED (Liters): 2L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
1540	1L	1L	100	5.45	7.85	23.96	13.86	3.89	1.30	-284	clear
1545	.5L	1.5L	100	5.45	7.80	23.93	14.47	4.24	1.85	-307	clear
1550	.5L	2.0L	100	5.45	7.81	23.91	14.22	4.35	1.60	-321	clear
1555	SAMPLE collected										

WELL CAPACITY (Liters Per Foot): 0.75" = 0.076; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: MARK mengel / NUS	SAMPLER(S) SIGNATURES: Mark L Mengel	SAMPLING INITIATED AT: 1555	SAMPLING ENDED AT: 1600
PUMP OR TUBING DEPTH IN WELL (feet): 32.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly	
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW14I	SAMPLE ID: 39A-21ST-MW0014I-024.5-201412 14 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12/14/14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 5.06	CASING HEIGHT (feet als): -0.3	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 5.36	WELL SCREEN INTERVAL DEPTH (feet bls):22-27	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 22	BOTTOM DEPTH (feet bls): 27

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.625 Liters .005 x 30 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 24.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 24.5	PURGING INITIATED AT: 0845	PURGING ENDED AT: 0905	TOTAL VOLUME PURGED (Liters): 2L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
0855	1L	1L	100	5.10	7.50	24.64	9.147	14.37	0.56	-294	clear
0900	.5L	1.5L	100	5.10	7.45	24.87	9.201	13.19	0.41	-301	clear
0905	.5L	2.0L	100	5.10	7.45	25.01	9.183	13.14	0.81	-300	clear
0910	sample collected										

WELL CAPACITY (Liters Per Foot): 0.75" = 0.076; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURES:	SAMPLING INITIATED AT: 0910	SAMPLING ENDED AT: 0915
MARK mengel / NUS	Mark L Mengel		

PUMP OR TUBING DEPTH IN WELL (feet): 24.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE

REMARKS:

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW15I	SAMPLE ID: 39A-21ST-MW0015I-038.5-201412 14 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-14-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 14.90	CASING HEIGHT (feet als): -0.3	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 15.20	WELL SCREEN INTERVAL DEPTH (feet bls):36-41	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 36	BOTTOM DEPTH (feet bls): 41

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: **1 EQUIPMENT VOL.** = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.68 Liters .005 x 41 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 38.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 38.5	PURGING INITIATED AT: 0930	PURGING ENDED AT: 0950	TOTAL VOLUME PURGED (Liters): 2L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
0940	1L	1L	100	14.90	7.36	24.04	11.45	5.89	0.46	292	clear
0945	.5L	1.5L	100	14.90	7.37	24.09	11.54	6.90	0.35	292	clear
0950	.5L	2.0L	100	14.90	7.36	24.06	11.55	7.84	0.37	296	clear
0955	sample collected										

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.076; **1"** = 0.15; **1.25"** = 0.23; **2"** = 0.61; **3"** = 1.40; **4"** = 2.46; **5"** = 3.86; **6"** = 5.57; **12"** = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): **1/8"** = 0.002; **3/16"** = 0.005; **1/4"** = 0.0098; **5/16"** = 0.015; **3/8"** = 0.023; **1/2"** = 0.038; **5/8"** = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: MARK Mengel / NUS	SAMPLER(S) SIGNATURES: Mark L Mengel	SAMPLING INITIATED AT: 0955	SAMPLING ENDED AT: 1000
PUMP OR TUBING DEPTH IN WELL (feet): 38.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly	
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW30I	SAMPLE ID: 39A-21ST-MW0030I-022.5-20141214 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-14-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 3.53	CASING HEIGHT (feet als): 2.5	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 3.78	WELL SCREEN INTERVAL DEPTH (feet bls):20-25

WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 20	BOTTOM DEPTH (feet bls): 25

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.6 L Liters .005 X 25 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 22.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 22.5	PURGING INITIATED AT: 1040	PURGING ENDED AT: 1100	TOTAL VOLUME PURGED (Liters): 2L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
1050	1L	1L	100	3.59	7.46	24.18	2.523	2.55	1.03	-283	clear
1055	.5L	1.5L	100	3.60	7.38	24.43	2.475	1.82	0.39	-279	clear
1100	.5L	2.0L	100	3.60	7.33	24.50	2.461	1.75	0.27	-277	clear
1105	SAMPLE collected										

WELL CAPACITY (Liters Per Foot): 0.75" = 0.076; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURES:	SAMPLING INITIATED AT: 1105	SAMPLING ENDED AT: 1110
MARK mengel / NUS	Mark L Mengel		

PUMP OR TUBING DEPTH IN WELL (feet): 22.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly

FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE

REMARKS:

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW25S	SAMPLE ID: 39A-21ST-MW0025S-014.5-20141214 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-14-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 2.57	CASING HEIGHT (feet als): -0.3	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 2.87	WELL SCREEN INTERVAL DEPTH (feet bls): 12-17	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 12	BOTTOM DEPTH (feet bls): 17

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.575 Liters .005 x 20 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 14.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 14.5	PURGING INITIATED AT: 1120	PURGING ENDED AT:	TOTAL VOLUME PURGED (Liters):

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (ml/pm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
1130	1L	1L	100	3.06	7.11	23.53	1.632	2.48	11.9	-184	clear
1135	.5L	1.5L	100	2.87	7.26	23.20	1.969	2.36	7.78	-206	clear
1140	.5L	2.0L	100	2.87	7.25	23.04	2.109	2.60	4.24	-219	clear
1145	sample collected										

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.076; **1"** = 0.15; **1.25"** = 0.23; **2"** = 0.61; **3"** = 1.40; **4"** = 2.46; **5"** = 3.66; **6"** = 5.57; **12"** = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): **1/8"** = 0.002; **3/16"** = 0.005; **1/4"** = 0.0098; **5/16"** = 0.015; **3/8"** = 0.023; **1/2"** = 0.038; **5/8"** = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: MARK mengel / NUS	SAMPLER(S) SIGNATURES: Mark L Mengel	SAMPLING INITIATED AT: 1145	SAMPLING ENDED AT: 1150
PUMP OR TUBING DEPTH IN WELL (feet): 14.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly	
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH		

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW26S	SAMPLE ID: 39A-21ST-MW0026S-017.5-20141214 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-14-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 2.48	CASING HEIGHT (feet als): -0.3	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 2.78	WELL SCREEN INTERVAL DEPTH (feet bls): 15-20	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 15	BOTTOM DEPTH (feet bls): 20

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.575 Liters .005x20+.475=

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 17.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 17.5	PURGING INITIATED AT: 1205	PURGING ENDED AT: 1225	TOTAL VOLUME PURGED (Liters): 2L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
1215	1L	1L	100	2.64	6.93	25.24	3.026	2.93	1.78	-204	clear
1220	.5L	1.5L	100	2.55	6.94	25.25	3.052	2.84	1.07	-234	clear
1225	.5	2L	100	2.55	6.96	25.26	3.058	2.64	1.21	-241	clear
1230	SAMPLE	COLLECTED									

WELL CAPACITY (Liters Per Foot): 0.75" = 0.076; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: MARK Mengel / NUS	SAMPLER(S) SIGNATURES: Mark K Mengel	SAMPLING INITIATED AT: 1230	SAMPLING ENDED AT: 1235
PUMP OR TUBING DEPTH IN WELL (feet): 17.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly	
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH		

REMARKS:

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; PE = Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); VT = Vacuum Trap; O = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: 21ST-MW28I	SAMPLE ID: 39A-21ST-MW0028I-024.5-201412 14 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-14-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 1.98	CASING HEIGHT (feet als): -0.3	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 2.28	WELL SCREEN INTERVAL DEPTH (feet bls):22-27	
WELL DIAMETER (inches): 1	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 22	BOTTOM DEPTH (feet bls): 27

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____ Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
0.625 ~~0.625~~ Liters .005 x 30 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 24.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 24.5	PURGING INITIATED AT: 1245	PURGING ENDED AT: 1305	TOTAL VOLUME PURGED (Liters): 2L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
1255	1L	1L	100	2.10	6.92	25.77	3.352	2.07	6.55	496	clear
1300	.5L	1.5L	100	2.10	6.96	25.80	3.353	2.14	4.92	-207	clear
1305	.5L	2.0L	100	2.10	6.99	25.81	3.350	2.32	5.01	-202	clear
1310	sample	collected									

WELL CAPACITY (Liters Per Foot): 0.75" = 0.076; 1" = 0.15; 1.25" = 0.23; 2" = 0.61; 3" = 1.40; 4" = 2.46; 5" = 3.86; 6" = 5.57; 12" = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): 1/8" = 0.002; 3/16" = 0.005; 1/4" = 0.0098; 5/16" = 0.015; 3/8" = 0.023; 1/2" = 0.038; 5/8" = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: MARK Mengel / NUS	SAMPLER(S) SIGNATURES: Mark R. Mengel	SAMPLING INITIATED AT: 1310	SAMPLING ENDED AT: 1315
PUMP OR TUBING DEPTH IN WELL (feet): 24.5	SAMPLE PUMP: FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly	
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

SITE NAME: LC39A	SITE LOCATION: Kennedy Space Center	
LOCATION ID: DBA-IW03S	SAMPLE ID: 39A-DBA-IW0003S-012.0-20141215 Sample depth (ddd.d)=[bottom of screen (feet bls)-Top depth] x 0.5-bottom of screen (feet bls)	DATE: 12-15-14

PURGING DATA

STATIC DEPTH TO WATER (feet btoc): 3.10	CASING HEIGHT (feet als): 0.30	STATIC DEPTH TO WATER (feet bls) = DTW (btoc) - Casing Height (feet als): 3.40	WELL SCREEN INTERVAL DEPTH (feet bls): 7-17	
WELL DIAMETER (inches): 2"	TUBING DIAMETER (inches): 3/16	PURGE PUMP TYPE OR BAILER: Peristaltic Pump	TOP DEPTH = top of screen or depth to water which ever is greatest (feet bls): 7	BOTTOM DEPTH (feet bls): 17

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
_____Liters

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
_____Liters .005 x 20 + .475 =

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 12.0	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 12.0	PURGING INITIATED AT: 0855	PURGING ENDED AT: 0920	TOTAL VOLUME PURGED (Liters): 2.5 L

TIME	VOLUME PURGED (Liters)	CUMUL. VOLUME PURGED (Liters)	PURGE RATE (mlpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (µS/cm)	DISSOLVED OXYGEN (mg/L)	TURBIDITY (NTUs)	ORP (mV)	COLOR (describe)
0905	1L	1L	100	3.23	7.08	20.32	2.335	2.47	15.7	58	clear
0910	.5L	1.5L	100	3.25	7.03	20.49	2.287	2.78	11.8	48	clear
0915	.5L	2.L	100	3.26	6.98	20.53	2.270	2.69	10.4	18	clear
0920	.5L	2.5L	100	3.27	6.96	20.54	2.272	2.45	7.31	1.0	clear
0925	sample	collected									

WELL CAPACITY (Liters Per Foot): **0.75"** = 0.076; **1"** = 0.15; **1.25"** = 0.23; **2"** = 0.61; **3"** = 1.40; **4"** = 2.46; **5"** = 3.86; **6"** = 5.57; **12"** = 22.26
TUBING INSIDE DIA. CAPACITY (Liters/Ft.): **1/8"** = 0.002; **3/16"** = 0.005; **1/4"** = 0.0098; **5/16"** = 0.015; **3/8"** = 0.023; **1/2"** = 0.038; **5/8"** = 0.06

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: MARK MENGEL / NUS	SAMPLER(S) SIGNATURES: Mark A Mengel	SAMPLING INITIATED AT: 0925	SAMPLING ENDED AT: 0930
PUMP OR TUBING DEPTH IN WELL (feet): 12.0	SAMPLE PUMP: SM FLOW RATE (mL per minute): 100	TUBING MATERIAL CODE: Poly	
FIELD DECONTAMINATION: (Y) N	FIELD-FILTERED: Y (N) FILTER SIZE: ____ µm Filtration Equipment Type: _____	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION				
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **PE** = Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING/PURGING EQUIPMENT CODES: **APP** = After Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **VT** = Vacuum Trap; **O** = Other (Specify)

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

ALS Environmental

9143 Philips Highway, Ste 200 • Jacksonville, FL 32256 (904) 739-2277 • 800-695-7222 x06 • FAX (904) 739-2011

SR#

CAS Contract

Project Name: LC 39A	Project Number: 112606925
Project Manager: Chris Pike	Email Address: Chris.Pike@TetraTech.com
Company/Address: TETRA TECH NUS 661 Andersen Drive Pittsburgh, PA 15220	
Phone #: 412-921-7090	FAX #
Sampler's Signature: Mark L Meagel	Sampler's Printed Name: MARK L. Meagel

ANALYSIS REQUESTED *(Include Method Number and Container Preservative)*

PRESERVATIVE: 1

NUMBER OF CONTAINERS | VOCs 8260B

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

REMARKS/ ALTERNATE DESCRIPTION

CLIENT SAMPLE ID	LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	VOCs 8260B
39A-21ST-MW0014I-0245-20	141214	12/14	0910	GW	3	3
39A-21ST-MW0015I-0385-20	141214	↓	0955	↓	↓	↓
39A-21ST-MW0030I-0225-20	141214		1105			
39A-21ST-MW0025S-0145-20	141214		1145			
39A-21ST-MW0026S-0175-20	141214		1230			
39A-21ST-MW0026I-0245-20	141214		1310			
39A-OBA-IW0003S-012-0-20	141215	12/15	0925			
39A-OBA-IW0003I-0355-20	141215	12/15	1000	↓	↓	↓

SPECIAL I NSTRUCTIONS/COMMENTS

See QAPP ☐

TURNAROUND REQUIREMENTS
_____ RUSH (SURCHARGES APPLY)
X STANDARD
REQUESTED FAX DATE
REQUESTED REPORT DATE

REPORT REQUIREMENTS
____ I. Results Only
____ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
____ III. Results + QC and Calibration Summaries
____ IV. Data Validation Report with Raw Data
____ V. Specialized Forms / Custom Report
Edata ____Yes ____No

INVOICE INFORMATION
PO #
BILL TO

SAMPLE RECEIPT: CONDITION/COOLER TEMP

CUSTODY SEALS Y N

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Mark L Meagel	Signature: FEDEX	Signature	Signature	Signature	Signature
Printed Name: MARK L. Meagel	Printed Name: #8066 0642 7918	Printed Name	Printed Name	Printed Name	Printed Name
Firm: TETRA TECH NUS	Firm	Firm	Firm	Firm	Firm
Date/Time: 12/15/14 1800	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

Distribution: White - Return to Originator; Yellow - Retained by Client

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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

ALS Environmental

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SR#

CAS Contract

Project Name: LC39A	Project Number: 112606925
Project Manager: CHRIS PIKE	Email Address: CHRIS.PIKE@TETRATECH.COM
Company/Address: TETRA TECH NUS 661 Andersen Drive Pittsburgh, PA 15220	
Phone #: 412-921-7090	FAX #
Sampler's Signature: Mark L Meagel	Sampler's Printed Name: MARK L. MEAGEL

ANALYSIS REQUESTED *(Include Method Number and Container Preservative)*

PRESERVATIVE: 2 ~~HCL~~ | 1

NUMBER OF CONTAINERS | VOCs 8260B

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

REMARKS/ ALTERNATE DESCRIPTION

CLIENT SAMPLE ID	LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	VOCs 8260B
39A-21ST-MW00119S-017.5-20141213		12/13/14	0855	GW	3	3
39A-21ST-MW00021S-017.5-20141213			0940			
39A-21ST-MW00018S-015.5-20141213			1030			
39A-21ST-MW00017S-016.5-20141213			1120			
39A-21ST-MW00017I-032.5-20141213			1200			
39A-21ST-MW00031I-025.5-20141213			1340			
39A-21ST-MW00032I-025.5-20141213			1355			
39A-21ST-MW00023S-017.5-20141213			1525			
39A-21ST-MW00023I-032.5-20141213			1535			
39A-21ST-TB121214			0800		1	1

SPECIAL INSTRUCTIONS/COMMENTS

See QAPP ☐

TURNAROUND REQUIREMENTS
_____ RUSH (SURCHARGES APPLY)
X STANDARD
REQUESTED FAX DATE

REQUESTED REPORT DATE

REPORT REQUIREMENTS
____ I. Results Only
____ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
____ III. Results + QC and Calibration Summaries
____ IV. Data Validation Report with Raw Data
____ V. Specialized Forms / Custom Report
Edata ____Yes ____No

INVOICE INFORMATION
PO #
BILL TO:

SAMPLE RECEIPT: CONDITION/COOLER TEMP: CUSTODY SEALS Y N

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Mark L Meagel	Signature: FEDEX	Signature	Signature	Signature	Signature
Printed Name: MARK L. MEAGEL	Printed Name: #806606427918	Printed Name	Printed Name	Printed Name	Printed Name
Firm: TETRATECH NUS	Firm	Firm	Firm	Firm	Firm
Date/Time: 12/15/14 1800	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

Distribution: White - Return to Originator; Yellow - Retained by Client

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APPENDIX E

LABORATORY ANALYTICAL RESULTS

PROVIDED IN ELECTRONIC VERSION ONLY

ALS Environmental
ALS Group USA, Corp
9143 Philips Highway, Suite 200
Jacksonville, FL 32256
T: 904-739-2277
F: 904-739-2011
www.alsglobal.com

February 12, 2015

Analytical Report for Service Request No: J1409737

Chris Pike
Tetra Tech NUS, Inc.
Foster Plaza 7
661 Andersen Drive
Pittsburgh, PA 15220

Laboratory Results for: LC39/112G06925

Dear Chris:

Enclosed are the results of the sample(s) submitted to our laboratory on December 16, 2014. For your reference, these analyses have been assigned our service request number **J1409737**.

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAP standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. In accordance to the NELAC 2003 Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Please contact me if you have any questions. My extension is 4409. You may also contact me via email at Craig.Myers@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Craig Myers
Project Manager

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Non CLP Tier IV (w/ Raw Data)

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This report contains a total of 377 pages

ALS Environmental, Inc.

Client:	Tetra Tech NUS, Inc.	**Service Request No.:**	J1409737
Project:	LC39	**Date Received:**	12/16/14
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV, validation deliverables including all summary forms and associated raw data. When appropriate to the procedure, method blank results have been reported with each analytical test. Analytical procedures performed by the lab are validated in accordance with NELAC standards. Parameters that are included in the NELAC Fields of Testing but are not included in the lab's NELAC accreditation are identified in the discussion of each analytical procedure.

Sample Receipt

Eighteen water samples were received for analysis at ALS Environmental on 12/16/14. The samples were received in good condition and consistent with the accompanying chain of custody form. Samples are refrigerated at $\leq$6°C upon receipt at the lab except for aqueous samples designated for metals analyses, which are stored at room temperature.

Volatile Organic Analyses:

Method 8260B: The lower control criterion was exceeded for the following analyte in the Continuing Calibration Verification (CCV) JWG1500319-2: Dichlorodifluoromethane. The analyte in question was not detected in the associated field samples. Since the analyte was detected in the MRL check standard, instrument sensitivity was documented. The data quality was not significantly affected and no further corrective action was taken.

Method 8260B: Method Blank JWG1500320-3 contained a low level of 1,4-Dichlorobenzene above the Method Reporting Limit (MRL). The associated sample J1409737-010 (Trip Blank) contained this compound in approximately the same concentration as the method blank. The data is flagged with a qualifier to indicate the results are estimated values. The method blank results may indicate the potential for a false positive.

Method 8260B: The spike recovery of Dichlorodifluoromethane for Laboratory Control Samples (LCS/DLCS) JWG1500320-1 and -2 was outside the lower control criterion. The analyte in question was not detected in the associated field samples. Since the analyte was detected in the MRL check standard, instrument sensitivity was documented. The data quality was not significantly affected and no further corrective action was taken.

Method 8260B: The result for Trichlorotrifluoroethane has been estimated in sample J1409737-003 because the concentration exceeded the instrument calibration range. Due to an inadvertent analyst error, the sample was not reanalyzed at a dilution. The result for this analyte should be considered estimated and may be potentially biased low.

Approved by _____ Date 2/12/15

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
J1409737-001	39A-21ST-MW00119S-017.5-20141213	12/13/14	08:55
J1409737-002	39A-21ST-MW0021S-017.5-20141213	12/13/14	09:40
J1409737-003	39A-21ST-MW0018S-015.5-20141213	12/13/14	10:30
J1409737-004	39A-21ST-MW0017S-016.5-20141213	12/13/14	11:20
J1409737-005	39A-21ST-MW0017I-032.5-20141213	12/13/14	12:00
J1409737-006	39A-21ST-MW0031I-025.5-20141213	12/13/14	13:40
J1409737-007	39A-21ST-MW0032I-025.5-20141213	12/13/14	12:55
J1409737-008	39A-21ST-MW0023S-017.5-20141213	12/13/14	15:25
J1409737-009	39A-21ST-MW0023I-032.5-20141213	12/13/14	15:55
J1409737-010	39A-21ST-TB-121214	12/13/14	08:00
J1409737-011	39A-21ST-MW0014I-024.5-20141214	12/14/14	09:10
J1409737-012	39A-21ST-MW0015I-038.5-20141214	12/14/14	09:55
J1409737-013	39A-21ST-MW0030I-02.5-20141214	12/14/14	11:05
J1409737-014	39A-21ST-MW0025S-014.5-20141214	12/14/14	11:45
J1409737-015	39A-21ST-MW0026S-017.5-20141214	12/14/14	12:30
J1409737-016	39A-21ST-MW0028I-024.5-20141214	12/14/14	13:10
J1409737-017	39A-DBA-IW0003S-012.0-20141215	12/15/14	09:25
J1409737-018	39A-DBA-IW0003I-035.5-20141215	12/15/14	10:00

ALS Environmental

State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
Department of Defense	66206	9/20/2016
Florida Department of Health	E82502	6/30/2015
Georgia Department of Natural Resources	958	6/30/2015
Kentucky Division of Waste Management	63	6/30/2015
Louisiana Department of Environmental Quality	02086	6/30/2015
Maine Department of Health and Human Services	2015002	2/3/2017
North Carolina Department of Environment and Natural Resources	527	12/31/2015
Pennsylvania Department of Environmental Protection	68-04835	8/31/2015
South Carolina Department of Health and Environmental Control	96021001	6/30/2015
Texas Commision on Environmental Quality	T104704197-13-5	5/31/2015
Virginia Environmental Accreditation Program	460191	12/14/2015

Data Qualifiers

Inorganic Data

* The result is an outlier. See case narrative.
\# The control limit criteria are not applicable. See case narrative.
B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E The result is an estimated amount because the value exceeded the instrument calibration range.
J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
Z Too many colonies were present (TNTC). The numeric value represents the filtration volume.
i The MRL/MDL has been elevated due to matrix interference.
X See case narrative.

Metals Data

* The result is an outlier. See case narrative.
\# The control limit criteria are not applicable. See case narrative.
J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E The reported value is estimated because of the presence of matrix interference.
M The duplicate injection precision was not met.
N The Matrix Spike sample recovery is not within control limits. See case narrative.
S The result was determined by Method of Standard Additions (MSA).
U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i The MRL/MDL has been elevated due to matrix interference.
X See case narrative.
\+ The correlation coefficient for the MSA is less than 0.995.

Organic Data

* The result is an outlier. See case narrative.
\# The control limit criteria are not applicable. See case narrative.
A The tentatively identified compound is a suspected aldol-condensation product.
B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D The reported result is from a dilution.
E The result is an estimated amount because the value exceeded the instrument calibration range.
J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P The GC or HPLC confirmation criteria were exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides)
U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i The MRL/MDL has been elevated due to a chromatographic interference.
X See case narrative.

Petroleum Hydrocarbon Specific

F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z The chromatographic fingerprint does not resemble a petroleum product.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Chain of Custody Documentation

9143 Philips Highway, Suite 200
Jacksonville, Florida 32256
Phone: (904) 739-2277 Fax (904) 739-2011
www.alsglobal.com

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

ALS Environmental

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PAGE 1 OF 2

SR# J1409737

CAS Contract

Project Name: LC 39A	Project Number: 112606925
Project Manager: CHRIS PIKE	Email Address: CHRIS.PIKE@TETRATECH.COM
Company/Address: TETRA TECH NUS 661 Andersen Drive Pittsburgh, PA 15220	
Phone #: 412-921-7090	FAX #
Sampler's Signature: Mark L Mengel	Sampler's Printed Name: MARK L. MENGEL

ANALYSIS REQUESTED *(Include Method Number and Container Preservative)*

PRESERVATIVE: 1 HCl | 1

NUMBER OF CONTAINERS | VOC's 8260B | [redacted]

1. HCl
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

REMARKS/ ALTERNATE DESCRIPTION

CLIENT SAMPLE ID	LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	VOC's 8260B
39A-21ST-MW0011S-017.5-20141213		12/13/14	0855	GW	3	3
39A-21ST-MW0021S-017.5-20141213			0940			
39A-21ST-MW0018S-015.5-20141213			1030			
39A-21ST-MW0017S-016.5-20141213			1120			
39A-21ST-MW0017I-032.5-20141213			1200			
39A-21ST-MW0031I-025.5-20141213			1340			
39A-21ST-MW0032I-025.5-20141213			1255			
39A-21ST-MW0023S-017.5-20141213			1525			
39A-21ST-MW0023I-032.5-20141213			1555			
39A-21ST-TB12121414			0800		2	1

SPECIAL I NSTRUCTIONS/COMMENTS

See QAPP ☐

TURNAROUND REQUIREMENTS
- ____ RUSH (SURCHARGES APPLY)
- X STANDARD

REQUESTED FAX DATE: _____

REQUESTED REPORT DATE: _____

REPORT REQUIREMENTS
- ____ I. Results Only
- ____ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
- ____ III. Results + QC and Calibration Summaries
- ____ IV. Data Validation Report with Raw Data
- ____ V. Specialized Forms / Custom Report

Edata ____ Yes ____ No

INVOICE INFORMATION
- PO #
- BILL TO:

SAMPLE RECEIPT: CONDITION/COOLER TEMP: CUSTODY SEALS: Y N

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
6					
Signature: Mark L Mengel	Signature: FEDEX	Signature: FEDEX	Signature: Sadira Alvarez	Signature	Signature
Printed Name: MARK L. MENGEL	Printed Name: #806606427918	Printed Name	Printed Name: Sadira Alvarez	Printed Name	Printed Name
Firm: TETRA TECH NUS	Firm	Firm	Firm: ALS	Firm	Firm
Date/Time: 12/15/14 1800	Date/Time	Date/Time	Date/Time: 12/16/14 1010	Date/Time	Date/Time

Distribution: White - Return to Originator; Yellow - Retained by Client

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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

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PAGE 2 OF 2

SR# 3140737

CAS Contract

Project Name: LC 39A	Project Number: 112606925
Project Manager: Chris Pike	Email Address: Chris.Pike@TetraTech.com
Company/Address: TETRA TECH NUS 661 Andersen Drive Pittsburgh, PA 15220	
Phone #: 412-921-7090	FAX #
Sampler's Signature: Mark L Mengel	Sampler's Printed Name: MARK L. Mengel

ANALYSIS REQUESTED (Include Method Number a [redacted]

PRESERVATIVE: 1

NUMBER OF CONTAINERS | VOCs 8260B

0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

REMARKS/ ALTERNATE DESCRIPTION

CLIENT SAMPLE ID	LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	VOCs 8260B
39A-21ST-MW0014I-0245-20141214		12/14	0910	GW	3	3
39A-21ST-MW0015I-038.5-20141214			0955			
39A-21ST-MW0030I-0225-20141214			1105			
39A-21ST-MW0025S-014.5-20141214			1145			
39A-21ST-MW0026S-017.5-20141214			1230			
39A-21ST-MW0028I-024.5-20141214			1310			
39A-OBA-IW0003S-012.0-20141215		12/15	0925			
39A-OBA-IW0003I-035.5-20141215		12/15	1000			

SPECIAL I NSTRUCTIONS/COMMENTS

See QAPP ☐

TURNAROUND REQUIREMENTS
_____ RUSH (SURCHARGES APPLY)
X STANDARD
REQUESTED FAX DATE

REQUESTED REPORT DATE

REPORT REQUIREMENTS
____ I. Results Only
____ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
____ III. Results + QC and Calibration Summaries
____ IV. Data Validation Report with Raw Data
____ V. Specialized Forms / Custom Report
Edata ____Yes ____No

INVOICE INFORMATION
PO #
BILL TO:

SAMPLE RECEIPT: CONDITION/COOLER TEMP: CUSTODY SEALS: Y N

1 RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Mark L Mengel	Signature: FEDEX	Signature: Fed Ex	Signature: [signature]	Signature:	Signature:
Printed Name: MARK L. Mengel	Printed Name: #806606427918	Printed Name:	Printed Name: JOCHRA ALVAREZ	Printed Name:	Printed Name:
Firm: TETRA Tech NUS	Firm:	Firm:	Firm: ALS	Firm:	Firm:
Date/Time: 12/15/14 1800	Date/Time:	Date/Time:	Date/Time: 12/16/14 1010	Date/Time:	Date/Time:

Distribution: White - Return to Originator; Yellow - Retained by Client

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ALS Environmental

Cooler Receipt Form

Client: TetraTech Service Request #: 1409737

Project: LC39A

Cooler received on 12/16/14 and opened on 12/17/14 by JA 12/17/14

COURIER: ALS UPS (FEDEX) Client Other _____ Airbill # ~~880~~ 806602427981

1	Were custody seals on outside of cooler?			Yes	(No)		
	If yes, how many and where?			#:___ on lid		other	
2	Were seals intact and signature and date correct?			Yes	No	(N/A)	
3	Were custody papers properly filled out?			(Yes)	No	N/A	
4	Temperature of cooler(s) upon receipt (Should be > 0°C and < 6°C)	0.1					
5	Thermometer ID	T81					
6	Temperature Blank Present?			(Yes)	No		
7	Were Ice or Ice Packs present			(Ice)	Ice Packs		No
8	Did all bottles arrive in good condition (unbroken, etc....)?			(Yes)	No	N/A	
9	Type of packing material present			Netting	Vial Holder	(Bubble Wrap)	
				Paper	Styrofoam	Other	N/A
10	Were all bottle labels complete (sample ID, preservation, etc....)?			(Yes)	No	N/A	
11	Did all bottle labels and tags agree with custody papers?			(Yes)	No	N/A	
12	Were the correct bottles used for the tests indicated?			(Yes)	No	N/A	
13	Were all of the preserved bottles received with the appropriate preservative?			Yes	No	(N/A)	
	HNO3 pH<2 H2SO4 pH<2 ZnAc2/NaOH pH>9 NaOH pH>12 HCl pH<2						
	Preservative additions noted below						
14	Were all samples received within analysis holding times?			(Yes)	No	N/A	
15	Were all VOA vials free of air bubbles? If present, note below			(Yes)	No	N/A	
16	Where did the bottles originate?			(ALS)	Client		

Sample ID	Reagent	Lot #	ml added	Initials Date/Time

Additional comments and/or explanation of all discrepancies noted above:

Client approval to run samples if discrepancies noted: Date: 11

ALS Environmental

Jacksonville Laboratory
Condition Upon Receipt - Sample pH

SR # J1409737 Date: 12/17/14 Initials: JH

Note that pH is check and meets the required pH criterion listed in the column heading unless otherwise noted on the cooler receipt form.

	40mL	40mL	40mL	125mL	125mL	125mL	125mL	250mL	250mL	250mL	250mL	250mL	250mL	250mL	500mL	500mL	500mL	500mL	500mL	1L	1L	1L	1L	1L	2oz	4oz	8oz	16oz	100ml	Ziplock	Misc	
Container	G	G	G	P	P	P	P	P	P	P	P	P	G	G	P	P	P	P	G	P	P	G	G	G	G	G	G	G	P	P	Misc.	
Preserve	N/A	HCl	Na2 S2O3	N/A	HCl	H2SO4	HNO3	N/A	H2SO4	HNO3	ZnAc2/ NaOH	NaOH	N/A	HNO3	N/A	HCl	H2SO4	HNO3	N/A	N/A	HNO3	N/A	HCl	H2SO4	N/A	N/A	N/A	N/A	Na2 S2O3	N/A	N/A	
Req. pH	N/A	<2	N/A	N/A	<2	<2	<2	N/A	<2	<2	>9	>12	N/A	<2	N/A	<2	<2	<2	N/A	N/A	<2	N/A	<2	<2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Sample #	-	-		-	-	-	-	-	-	-		-		-	-	-	-	-	-	-	-	-	-	-				-	-		-	
-1		3																														-1
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Note: VOA pH checks are performed by the analytical area, not sample control.

CUR Preservation Checklist

10/11/2013

Summary Package

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www.alsglobal.com

Organic Analysis:
Volatile Organic Compounds by GC/MS

Summary Package

Sample and QC Results

Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925

Cover Page - Organic Analysis Data Package
Volatile Organic Compounds by GC/MS

Sample Name	Lab Code	Date Collected	Date Received
39A-21ST-MW00119S-017.5-20141213	J1409737-001	12/13/2014	12/16/2014
39A-21ST-MW0021S-017.5-20141213	J1409737-002	12/13/2014	12/16/2014
39A-21ST-MW0018S-015.5-20141213	J1409737-003	12/13/2014	12/16/2014
39A-21ST-MW0017S-016.5-20141213	J1409737-004	12/13/2014	12/16/2014
39A-21ST-MW0017I-032.5-20141213	J1409737-005	12/13/2014	12/16/2014
39A-21ST-MW00311-025.5-20141213	J1409737-006	12/13/2014	12/16/2014
39A-21ST-MW0032I-025.5-20141213	J1409737-007	12/13/2014	12/16/2014
39A-21ST-MW0023S-017.5-20141213	J1409737-008	12/13/2014	12/16/2014
39A-21ST-MW0023I-032.5-20141213	J1409737-009	12/13/2014	12/16/2014
39A-21ST-TB-121214	J1409737-010	12/13/2014	12/16/2014
39A-21ST-MW0014I-024.5-20141214	J1409737-011	12/14/2014	12/16/2014
39A-21ST-MW0015I-038.5-20141214	J1409737-012	12/14/2014	12/16/2014
39A-21ST-MW0030I-02.5-20141214	J1409737-013	12/14/2014	12/16/2014
39A-21ST-MW0025S-014.5-20141214	J1409737-014	12/14/2014	12/16/2014
39A-21ST-MW0026S-017.5-20141214	J1409737-015	12/14/2014	12/16/2014
39A-21ST-MW0028I-024.5-20141214	J1409737-016	12/14/2014	12/16/2014
39A-DBA-IW0003S-012.0-20141215	J1409737-017	12/15/2014	12/16/2014
39A-DBA-IW0003I-035.5-20141215	J1409737-018	12/15/2014	12/16/2014

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW00119S-017.5-20141213
Lab Code: J1409737-001

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	7.3		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW00119S-017.5-20141213
Lab Code: J1409737-001

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.28**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**7.6**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	105	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	97	86-113	12/23/14	Acceptable
Dibromofluoromethane	102	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0021S-017.5-20141213
Lab Code: J1409737-002

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**29**		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0021S-017.5-20141213
Lab Code: J1409737-002

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.19**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**0.88**	I	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	105	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	101	86-113	12/23/14	Acceptable
Dibromofluoromethane	101	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0018S-015.5-20141213
Lab Code: J1409737-003

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	22		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0018S-015.5-20141213
Lab Code: J1409737-003

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	**37**	J	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	**16**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	**32**		20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	**3900**	L	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**2.7**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	104	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	99	86-113	12/23/14	Acceptable
Dibromofluoromethane	106	86-112	12/23/14	Acceptable
Toluene-d8	109	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0017S-016.5-20141213
Lab Code: J1409737-004

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	ND	U	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

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Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0017S-016.5-20141213
Lab Code: J1409737-004

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	**0.64**	I	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**1.3**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	105	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	99	86-113	12/23/14	Acceptable
Dibromofluoromethane	106	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0017I-032.5-20141213
Lab Code: J1409737-005

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	**0.98**	I	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**0.84**	I	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0017I-032.5-20141213
Lab Code: J1409737-005

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**1.7**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	106	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	97	86-113	12/23/14	Acceptable
Dibromofluoromethane	102	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0031I-025.5-20141213
Lab Code: J1409737-006

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**0.51**	I	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0031I-025.5-20141213
Lab Code: J1409737-006

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.86**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**1.7**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	107	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	98	86-113	12/23/14	Acceptable
Dibromofluoromethane	98	86-112	12/23/14	Acceptable
Toluene-d8	108	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0032I-025.5-20141213
Lab Code: J1409737-007

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	**0.44**	I	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	1.7		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0032I-025.5-20141213
Lab Code: J1409737-007

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**1.5**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	**4.7**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**7.3**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	110	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	99	86-113	12/23/14	Acceptable
Dibromofluoromethane	102	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0023S-017.5-20141213
Lab Code: J1409737-008

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	4.7		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

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Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0023S-017.5-20141213
Lab Code: J1409737-008

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	**0.23**	I	20	0.23	1	12/23/14	12/23/14	JWG1500320	
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	**5.1**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**2.9**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	106	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	96	86-113	12/23/14	Acceptable
Dibromofluoromethane	105	86-112	12/23/14	Acceptable
Toluene-d8	110	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0023I-032.5-20141213
Lab Code: J1409737-009

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	**0.22**	I	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**0.46**	I	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0023I-032.5-20141213
Lab Code: J1409737-009

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.80**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	110	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	100	86-113	12/23/14	Acceptable
Dibromofluoromethane	103	86-112	12/23/14	Acceptable
Toluene-d8	108	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-TB-121214
Lab Code: J1409737-010

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	**4.2**	V	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	ND	U	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-TB-121214
Lab Code: J1409737-010

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	102	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	100	86-113	12/23/14	Acceptable
Dibromofluoromethane	102	86-112	12/23/14	Acceptable
Toluene-d8	110	88-115	12/23/14	Acceptable

Comments:

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0014I-024.5-20141214
Lab Code: J1409737-011

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	1.1		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0014I-024.5-20141214
Lab Code: J1409737-011

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**3.2**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**3.7**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	102	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	97	86-113	12/23/14	Acceptable
Dibromofluoromethane	99	86-112	12/23/14	Acceptable
Toluene-d8	108	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0015I-038.5-20141214
Lab Code: J1409737-012

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	**4.2**	V	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**1.2**		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0015I-038.5-20141214
Lab Code: J1409737-012

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**1.7**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**1.7**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	111	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	100	86-113	12/23/14	Acceptable
Dibromofluoromethane	104	86-112	12/23/14	Acceptable
Toluene-d8	109	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0030I-02.5-20141214
Lab Code: J1409737-013

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	9.1		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0030I-02.5-20141214
Lab Code: J1409737-013

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.42**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**6.8**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	106	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	98	86-113	12/23/14	Acceptable
Dibromofluoromethane	106	86-112	12/23/14	Acceptable
Toluene-d8	108	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0025S-014.5-20141214
Lab Code: J1409737-014

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**0.48**	I	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0025S-014.5-20141214
Lab Code: J1409737-014

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.12**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	103	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	99	86-113	12/23/14	Acceptable
Dibromofluoromethane	100	86-112	12/23/14	Acceptable
Toluene-d8	108	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0026S-017.5-20141214
Lab Code: J1409737-015

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	2.3		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0026S-017.5-20141214
Lab Code: J1409737-015

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**1.0**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**21**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	106	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	100	86-113	12/23/14	Acceptable
Dibromofluoromethane	100	86-112	12/23/14	Acceptable
Toluene-d8	109	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0028I-024.5-20141214
Lab Code: J1409737-016

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	5.3		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0028I-024.5-20141214
Lab Code: J1409737-016

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.33**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**11**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	104	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	100	86-113	12/23/14	Acceptable
Dibromofluoromethane	106	86-112	12/23/14	Acceptable
Toluene-d8	106	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/15/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-DBA-IW0003S-012.0-20141215
Lab Code: J1409737-017

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	ND	U	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/15/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-DBA-IW0003S-012.0-20141215
Lab Code: J1409737-017

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	109	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	103	86-113	12/23/14	Acceptable
Dibromofluoromethane	103	86-112	12/23/14	Acceptable
Toluene-d8	109	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/15/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-DBA-IW0003I-035.5-20141215
Lab Code: J1409737-018

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	ND	U	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

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Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/15/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-DBA-IW0003I-035.5-20141215
Lab Code: J1409737-018

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	111	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	101	86-113	12/23/14	Acceptable
Dibromofluoromethane	105	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: NA
Date Received: NA

Volatile Organic Compounds by GC/MS

Sample Name: Method Blank
Lab Code: JWG1500320-3

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	**0.24**	I	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	**4.3**		1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	ND	U	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: NA
Date Received: NA

Volatile Organic Compounds by GC/MS

Sample Name: Method Blank
Lab Code: JWG1500320-3

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	104	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	99	86-113	12/23/14	Acceptable
Dibromofluoromethane	100	86-112	12/23/14	Acceptable
Toluene-d8	111	88-115	12/23/14	Acceptable

Comments:

Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925
Sample Matrix: Water

Surrogate Recovery Summary
Volatile Organic Compounds by GC/MS

Extraction Method: EPA 5030B **Units:** Percent
Analysis Method: 8260B **Level:** Low

Sample Name	Lab Code	Sur1	Sur2	Sur3	Sur4
39A-21ST-MW00119S-017.5-201	J1409737-001	105	97	102	107
39A-21ST-MW0021S-017.5-2014	J1409737-002	105	101	101	107
39A-21ST-MW0018S-015.5-2014	J1409737-003	104	99	106	109
39A-21ST-MW0017S-016.5-2014	J1409737-004	105	99	106	107
39A-21ST-MW0017I-032.5-2014	J1409737-005	106	97	102	107
39A-21ST-MW0031I-025.5-2014	J1409737-006	107	98	98	108
39A-21ST-MW0032I-025.5-2014	J1409737-007	110	99	102	107
39A-21ST-MW0023S-017.5-2014	J1409737-008	106	96	105	110
39A-21ST-MW0023I-032.5-2014	J1409737-009	110	100	103	108
39A-21ST-TB-121214	J1409737-010	102	100	102	110
39A-21ST-MW0014I-024.5-2014	J1409737-011	102	97	99	108
39A-21ST-MW0015I-038.5-2014	J1409737-012	111	100	104	109
39A-21ST-MW0030I-02.5-20141	J1409737-013	106	98	106	108
39A-21ST-MW0025S-014.5-2014	J1409737-014	103	99	100	108
39A-21ST-MW0026S-017.5-2014	J1409737-015	106	100	100	109
39A-21ST-MW0028I-024.5-2014	J1409737-016	104	100	106	106
39A-DBA-IW0003S-012.0-20141	J1409737-017	109	103	103	109
39A-DBA-IW0003I-035.5-20141	J1409737-018	111	101	105	107
Method Blank	JWG1500320-3	104	99	100	111
Lab Control Sample	JWG1500320-1	97	103	99	103
Duplicate Lab Control Sample	JWG1500320-2	97	99	100	105

Surrogate Recovery Control Limits (%)

Sur1 = 1,2-Dichloroethane-d4	72-121
Sur2 = 4-Bromofluorobenzene	86-113
Sur3 = Dibromofluoromethane	86-112
Sur4 = Toluene-d8	88-115

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
Date Analyzed: 12/23/2014
Time Analyzed: 12:30

Internal Standard Area and RT Summary
Volatile Organic Compounds by GC/MS

File ID: I:\MS52\DATA\MS52-141223\1223-002.D
Instrument ID: ms52
Analysis Method: 8260B

Lab Code: JWG1500319-2
Analysis Lot: JWG1500319

		1,4-Dichlorobenzene-d4		Chlorobenzene-d5		Fluorobenzene	
		Area	RT	Area	RT	Area	RT
ICAL Average ==>		430,327	13.67	517,196	11.27	952,284	8.15
Upper Limit ==>		860,654	14.17	1,034,393	11.77	1,904,569	8.65
Lower Limit ==>		215,164	13.17	258,598	10.77	476,142	7.65
Associated Analyses							
Continuing Calibration Verification	JWG1500319-2	552,311	13.67	678,364	11.27	1,303,711	8.15
Lab Control Sample	JWG1500320-1	570,357	13.67	722,806	11.27	1,392,513	8.15
Duplicate Lab Control Sample	JWG1500320-2	615,580	13.67	737,241	11.27	1,442,456	8.15
Method Blank	JWG1500320-3	449,688	13.67	603,816	11.27	1,236,744	8.15
39A-21ST-TB-121214	J1409737-010	422,680	13.67	574,952	11.27	1,192,926	8.15
39A-21ST-MW00119S-017.5-2014	J1409737-001	408,349	13.67	564,007	11.27	1,141,576	8.15
39A-21ST-MW0021S-017.5-20141	J1409737-002	384,161	13.67	540,787	11.27	1,086,442	8.15
39A-21ST-MW0018S-015.5-20141	J1409737-003	381,036	13.67	516,899	11.27	1,072,269	8.15
39A-21ST-MW0017S-016.5-20141	J1409737-004	382,566	13.67	528,367	11.27	1,060,454	8.15
39A-21ST-MW0017I-032.5-20141	J1409737-005	374,875	13.67	507,626	11.27	1,027,652	8.15
39A-21ST-MW0031I-025.5-20141	J1409737-006	369,856	13.67	501,750	11.27	1,039,669	8.15
39A-21ST-MW0032I-025.5-20141	J1409737-007	367,551	13.67	502,617	11.27	1,010,178	8.15
39A-21ST-MW0023S-017.5-20141	J1409737-008	368,915	13.67	488,009	11.27	996,272	8.15
39A-21ST-MW0023I-032.5-20141	J1409737-009	360,195	13.67	496,593	11.27	1,006,483	8.15
39A-21ST-MW0014I-024.5-20141	J1409737-011	367,631	13.67	516,867	11.27	1,062,469	8.15
39A-21ST-MW0015I-038.5-20141	J1409737-012	349,257	13.67	488,752	11.27	979,594	8.15
39A-21ST-MW0030I-02.5-201412	J1409737-013	358,012	13.67	495,792	11.27	1,001,006	8.15
39A-21ST-MW0025S-014.5-20141	J1409737-014	354,848	13.67	490,040	11.27	996,678	8.15
39A-21ST-MW0026S-017.5-20141	J1409737-015	345,231	13.67	475,351	11.27	977,360	8.15
39A-21ST-MW0028I-024.5-20141	J1409737-016	346,755	13.67	492,325	11.27	986,282	8.15
39A-DBA-IW0003S-012.0-201412	J1409737-017	339,278	13.67	480,384	11.27	980,584	8.15
39A-DBA-IW0003I-035.5-2014121	J1409737-018	332,772	13.67	477,730	11.27	956,754	8.15

Results flagged with an asterisk (*) indicate values outside control criteria.

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Extracted: 12/23/2014
Date Analyzed: 12/23/2014

Lab Control Spike/Duplicate Lab Control Spike Summary
Volatile Organic Compounds by GC/MS

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: JWG1500320

	Lab Control Sample JWG1500320-1 Lab Control Spike			Duplicate Lab Control Sample JWG1500320-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
1,1,1,2-Tetrachloroethane	48.0	50.0	96	48.9	50.0	98	77-118	2	30
1,1,1-Trichloroethane (TCA)	44.1	50.0	88	46.0	50.0	92	70-122	4	30
1,1,2,2-Tetrachloroethane	51.2	50.0	102	49.8	50.0	100	66-135	3	30
1,1,2-Trichloroethane	48.2	50.0	96	48.9	50.0	98	75-122	1	30
1,1-Dichloroethane	48.5	50.0	97	50.1	50.0	100	79-117	3	30
1,1-Dichloroethene	48.3	50.0	97	50.8	50.0	102	72-128	5	30
1,2,3-Trichlorobenzene	53.8	50.0	108	54.0	50.0	108	62-136	0	30
1,2,4-Trichlorobenzene	51.2	50.0	102	51.4	50.0	103	66-127	0	30
1,2-Dibromo-3-chloropropane (DBCP	54.3	50.0	109	51.5	50.0	103	60-122	5	30
1,2-Dibromoethane (EDB)	50.0	50.0	100	49.5	50.0	99	76-118	1	30
1,2-Dichlorobenzene	49.2	50.0	98	47.8	50.0	96	81-115	3	30
1,2-Dichloroethane (EDC)	49.2	50.0	98	50.0	50.0	100	70-117	2	30
1,2-Dichloropropane	47.5	50.0	95	48.6	50.0	97	79-117	2	30
1,3-Dichlorobenzene	49.2	50.0	98	48.3	50.0	97	82-116	2	30
1,4-Dichlorobenzene	42.3	50.0	85	42.6	50.0	85	82-115	1	30
2-Butanone (MEK)	47.2	50.0	94	48.9	50.0	98	62-138	3	30
2-Hexanone	52.5	50.0	105	50.5	50.0	101	74-127	4	30
4-Methyl-2-pentanone (MIBK)	53.0	50.0	106	52.2	50.0	104	77-120	1	30
Acetone	45.8	50.0	92	40.3	50.0	81	42-161	13	30
Benzene	47.9	50.0	96	49.1	50.0	98	80-117	3	30
Bromochloromethane	47.1	50.0	94	47.8	50.0	96	78-118	2	30
Bromodichloromethane	46.4	50.0	93	46.4	50.0	93	75-118	0	30
Bromoform	49.0	50.0	98	47.6	50.0	95	63-121	3	30
Bromomethane	46.8	50.0	94	53.7	50.0	107	31-153	14	30
Carbon Disulfide	47.6	50.0	95	50.5	50.0	101	72-128	6	30
Carbon Tetrachloride	44.4	50.0	89	46.6	50.0	93	67-124	5	30
Chlorobenzene	48.8	50.0	98	50.6	50.0	101	83-118	4	30
Chloroethane	43.3	50.0	87	34.2	50.0	68	68-132	24	30
Chloroform	48.1	50.0	96	49.2	50.0	98	77-116	2	30
Chloromethane	43.2	50.0	86	38.6	50.0	77	60-128	11	30
cis-1,2-Dichloroethene	49.1	50.0	98	50.0	50.0	100	78-117	2	30
cis-1,3-Dichloropropene	51.4	50.0	103	52.5	50.0	105	80-119	2	30
Cyclohexane	45.9	50.0	92	47.0	50.0	94	75-124	2	30
Dibromochloromethane	47.5	50.0	95	48.3	50.0	97	74-121	2	30
Dichlorodifluoromethane	19.1	50.0	38 *	20.9	50.0	42 *	49-132	9	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Extracted: 12/23/2014
Date Analyzed: 12/23/2014

Lab Control Spike/Duplicate Lab Control Spike Summary
Volatile Organic Compounds by GC/MS

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: JWG1500320

	Lab Control Sample JWG1500320-1 Lab Control Spike			Duplicate Lab Control Sample JWG1500320-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Ethylbenzene	47.3	50.0	95	50.4	50.0	101	82-119	6	30
Isopropylbenzene	49.8	50.0	100	48.9	50.0	98	78-119	2	30
m,p-Xylenes	84.3	100	84	88.5	100	89	79-122	5	30
Methyl Acetate	46.9	50.0	94	45.1	50.0	90	50-137	4	30
Methyl tert-Butyl Ether	46.5	50.0	93	45.5	50.0	91	73-118	2	30
Methylene Chloride	47.5	50.0	95	46.5	50.0	93	75-123	2	30
o-Xylene	43.8	50.0	88	45.8	50.0	92	80-119	4	30
Styrene	44.6	50.0	89	46.8	50.0	94	80-121	5	30
Tetrachloroethene (PCE)	48.3	50.0	97	51.4	50.0	103	75-126	6	30
Toluene	48.0	50.0	96	50.5	50.0	101	52-152	5	30
trans-1,2-Dichloroethene	48.8	50.0	98	51.6	50.0	103	75-121	6	30
trans-1,3-Dichloropropene	51.0	50.0	102	51.8	50.0	104	76-118	2	30
Trichloroethene (TCE)	42.3	50.0	85	44.8	50.0	90	78-122	6	30
Trichlorofluoromethane	41.1	50.0	82	42.2	50.0	84	58-134	3	30
Trichlorotrifluoroethane	50.4	50.0	101	52.5	50.0	105	77-128	4	30
Vinyl Chloride	48.9	50.0	98	51.8	50.0	104	69-138	6	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Extracted: 12/23/2014
Date Analyzed: 12/23/2014
Time Analyzed: 14:50

Method Blank Summary
Volatile Organic Compounds by GC/MS

Sample Name: Method Blank
Lab Code: JWG1500320-3

Extraction Method: EPA 5030B
Analysis Method: 8260B

Instrument ID: ms52
File ID: I:\MS52\DATA\MS52-141223\1223-007.D

Level: Low
Extraction Lot: JWG1500320

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	JWG1500320-1	I:\MS52\DATA\MS52-141223\1223-003.D	12/23/14	12:57
Duplicate Lab Control Sample	JWG1500320-2	I:\MS52\DATA\MS52-141223\1223-004.D	12/23/14	13:25
39A-21ST-TB-121214	J1409737-010	I:\MS52\DATA\MS52-141223\1223-008.D	12/23/14	15:17
39A-21ST-MW00119S-017.5-20141213	J1409737-001	I:\MS52\DATA\MS52-141223\1223-009.D	12/23/14	15:45
39A-21ST-MW0021S-017.5-20141213	J1409737-002	I:\MS52\DATA\MS52-141223\1223-010.D	12/23/14	16:12
39A-21ST-MW0018S-015.5-20141213	J1409737-003	I:\MS52\DATA\MS52-141223\1223-011.D	12/23/14	16:39
39A-21ST-MW0017S-016.5-20141213	J1409737-004	I:\MS52\DATA\MS52-141223\1223-012.D	12/23/14	17:06
39A-21ST-MW0017I-032.5-20141213	J1409737-005	I:\MS52\DATA\MS52-141223\1223-013.D	12/23/14	17:33
39A-21ST-MW0031I-025.5-20141213	J1409737-006	I:\MS52\DATA\MS52-141223\1223-014.D	12/23/14	18:01
39A-21ST-MW0032I-025.5-20141213	J1409737-007	I:\MS52\DATA\MS52-141223\1223-015.D	12/23/14	18:28
39A-21ST-MW0023S-017.5-20141213	J1409737-008	I:\MS52\DATA\MS52-141223\1223-016.D	12/23/14	18:55
39A-21ST-MW0023I-032.5-20141213	J1409737-009	I:\MS52\DATA\MS52-141223\1223-017.D	12/23/14	19:22
39A-21ST-MW0014I-024.5-20141214	J1409737-011	I:\MS52\DATA\MS52-141223\1223-018.D	12/23/14	19:49
39A-21ST-MW0015I-038.5-20141214	J1409737-012	I:\MS52\DATA\MS52-141223\1223-019.D	12/23/14	20:17
39A-21ST-MW0030I-02.5-20141214	J1409737-013	I:\MS52\DATA\MS52-141223\1223-020.D	12/23/14	20:44
39A-21ST-MW0025S-014.5-20141214	J1409737-014	I:\MS52\DATA\MS52-141223\1223-021.D	12/23/14	21:12
39A-21ST-MW0026S-017.5-20141214	J1409737-015	I:\MS52\DATA\MS52-141223\1223-022.D	12/23/14	21:39
39A-21ST-MW0028I-024.5-20141214	J1409737-016	I:\MS52\DATA\MS52-141223\1223-023.D	12/23/14	22:06
39A-DBA-IW0003S-012.0-20141215	J1409737-017	I:\MS52\DATA\MS52-141223\1223-024.D	12/23/14	22:33
39A-DBA-IW0003I-035.5-20141215	J1409737-018	I:\MS52\DATA\MS52-141223\1223-025.D	12/23/14	23:00

QA/QC Report

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Extracted: 12/23/2014
Date Analyzed: 12/23/2014
Time Analyzed: 12:57

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Sample Name: Lab Control Sample
Lab Code: JWG1500320-1

Instrument ID: ms52
File ID: I:\MS52\DATA\MS52-141223\1223-003.D

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low
Extraction Lot: JWG1500320

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	JWG1500320-3	I:\MS52\DATA\MS52-141223\1223-007.D	12/23/14	14:50
39A-21ST-TB-121214	J1409737-010	I:\MS52\DATA\MS52-141223\1223-008.D	12/23/14	15:17
39A-21ST-MW00119S-017.5-20141213	J1409737-001	I:\MS52\DATA\MS52-141223\1223-009.D	12/23/14	15:45
39A-21ST-MW0021S-017.5-20141213	J1409737-002	I:\MS52\DATA\MS52-141223\1223-010.D	12/23/14	16:12
39A-21ST-MW0018S-015.5-20141213	J1409737-003	I:\MS52\DATA\MS52-141223\1223-011.D	12/23/14	16:39
39A-21ST-MW0017S-016.5-20141213	J1409737-004	I:\MS52\DATA\MS52-141223\1223-012.D	12/23/14	17:06
39A-21ST-MW0017I-032.5-20141213	J1409737-005	I:\MS52\DATA\MS52-141223\1223-013.D	12/23/14	17:33
39A-21ST-MW0031I-025.5-20141213	J1409737-006	I:\MS52\DATA\MS52-141223\1223-014.D	12/23/14	18:01
39A-21ST-MW0032I-025.5-20141213	J1409737-007	I:\MS52\DATA\MS52-141223\1223-015.D	12/23/14	18:28
39A-21ST-MW0023S-017.5-20141213	J1409737-008	I:\MS52\DATA\MS52-141223\1223-016.D	12/23/14	18:55
39A-21ST-MW0023I-032.5-20141213	J1409737-009	I:\MS52\DATA\MS52-141223\1223-017.D	12/23/14	19:22
39A-21ST-MW0014I-024.5-20141214	J1409737-011	I:\MS52\DATA\MS52-141223\1223-018.D	12/23/14	19:49
39A-21ST-MW0015I-038.5-20141214	J1409737-012	I:\MS52\DATA\MS52-141223\1223-019.D	12/23/14	20:17
39A-21ST-MW0030I-02.5-20141214	J1409737-013	I:\MS52\DATA\MS52-141223\1223-020.D	12/23/14	20:44
39A-21ST-MW0025S-014.5-20141214	J1409737-014	I:\MS52\DATA\MS52-141223\1223-021.D	12/23/14	21:12
39A-21ST-MW0026S-017.5-20141214	J1409737-015	I:\MS52\DATA\MS52-141223\1223-022.D	12/23/14	21:39
39A-21ST-MW0028I-024.5-20141214	J1409737-016	I:\MS52\DATA\MS52-141223\1223-023.D	12/23/14	22:06
39A-DBA-IW0003S-012.0-20141215	J1409737-017	I:\MS52\DATA\MS52-141223\1223-024.D	12/23/14	22:33
39A-DBA-IW0003I-035.5-20141215	J1409737-018	I:\MS52\DATA\MS52-141223\1223-025.D	12/23/14	23:00

QA/QC Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
Date Analyzed: 12/23/2014
Time Analyzed: 12:03

Tune Summary
Volatile Organic Compounds by GC/MS

File ID: I:\MS52\DATA\MS52-141223\1223-001.D
Instrument ID: ms52
Column:

Analysis Method: 8260B
Analysis Lot: JWG1500319

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
50	95	15	40	21.7	56184	PASS
75	95	30	60	52.3	135550	PASS
95	95	100	100	100.0	259349	PASS
96	95	5	9	6.9	17809	PASS
173	174	0	2	1.1	2023	PASS
174	95	50	120	67.9	176064	PASS
175	174	5	9	8.4	14718	PASS
176	174	95	101	98.9	174165	PASS
177	176	5	9	7.3	12781	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	JWG1500319-2	I:\MS52\DATA\MS52-141223\1223-002.D	12/23/2014	12:30	
Lab Control Sample	JWG1500320-1	I:\MS52\DATA\MS52-141223\1223-003.D	12/23/2014	12:57	
Duplicate Lab Control Sample	JWG1500320-2	I:\MS52\DATA\MS52-141223\1223-004.D	12/23/2014	13:25	
Method Blank	JWG1500320-3	I:\MS52\DATA\MS52-141223\1223-007.D	12/23/2014	14:50	
39A-21ST-TB-121214	J1409737-010	I:\MS52\DATA\MS52-141223\1223-008.D	12/23/2014	15:17	
39A-21ST-MW00119S-017.5-20141213	J1409737-001	I:\MS52\DATA\MS52-141223\1223-009.D	12/23/2014	15:45	
39A-21ST-MW0021S-017.5-20141213	J1409737-002	I:\MS52\DATA\MS52-141223\1223-010.D	12/23/2014	16:12	
39A-21ST-MW0018S-015.5-20141213	J1409737-003	I:\MS52\DATA\MS52-141223\1223-011.D	12/23/2014	16:39	
39A-21ST-MW0017S-016.5-20141213	J1409737-004	I:\MS52\DATA\MS52-141223\1223-012.D	12/23/2014	17:06	
39A-21ST-MW0017I-032.5-20141213	J1409737-005	I:\MS52\DATA\MS52-141223\1223-013.D	12/23/2014	17:33	
39A-21ST-MW0031I-025.5-20141213	J1409737-006	I:\MS52\DATA\MS52-141223\1223-014.D	12/23/2014	18:01	
39A-21ST-MW0032I-025.5-20141213	J1409737-007	I:\MS52\DATA\MS52-141223\1223-015.D	12/23/2014	18:28	
39A-21ST-MW0023S-017.5-20141213	J1409737-008	I:\MS52\DATA\MS52-141223\1223-016.D	12/23/2014	18:55	
39A-21ST-MW0023I-032.5-20141213	J1409737-009	I:\MS52\DATA\MS52-141223\1223-017.D	12/23/2014	19:22	
39A-21ST-MW0014I-024.5-20141214	J1409737-011	I:\MS52\DATA\MS52-141223\1223-018.D	12/23/2014	19:49	
39A-21ST-MW0015I-038.5-20141214	J1409737-012	I:\MS52\DATA\MS52-141223\1223-019.D	12/23/2014	20:17	
39A-21ST-MW0030I-02.5-20141214	J1409737-013	I:\MS52\DATA\MS52-141223\1223-020.D	12/23/2014	20:44	
39A-21ST-MW0025S-014.5-20141214	J1409737-014	I:\MS52\DATA\MS52-141223\1223-021.D	12/23/2014	21:12	
39A-21ST-MW0026S-017.5-20141214	J1409737-015	I:\MS52\DATA\MS52-141223\1223-022.D	12/23/2014	21:39	
39A-21ST-MW0028I-024.5-20141214	J1409737-016	I:\MS52\DATA\MS52-141223\1223-023.D	12/23/2014	22:06	
39A-DBA-IW0003S-012.0-20141215	J1409737-017	I:\MS52\DATA\MS52-141223\1223-024.D	12/23/2014	22:33	
39A-DBA-IW0003I-035.5-20141215	J1409737-018	I:\MS52\DATA\MS52-141223\1223-025.D	12/23/2014	23:00	

Results flagged with an asterisk (*) indicate the analysis performed outside specified tune window

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
ICAL Date: 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292
Instrument ID: ms52

Column: MS

Level ID	File ID
A	I:\MS52\DATA\MS52-141128\1128-008.D
B	I:\MS52\DATA\MS52-141128\1128-009.D
C	I:\MS52\DATA\MS52-141128\1128-010.D
D	I:\MS52\DATA\MS52-141128\1128-011.D
E	I:\MS52\DATA\MS52-141128\1128-012.D
F	I:\MS52\DATA\MS52-141128\1128-014.D
G	I:\MS52\DATA\MS52-141128\1128-016.D
H	I:\MS52\DATA\MS52-141128\1128-019.D

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
1,1,1,2-Tetrachloroethane	A	1.0	0.493	B	5.0	0.645	C	10	0.636	D	20	0.669	E	50	0.652
	F	100	0.672	G	200	0.707	H	500	0.829						
1,1,1-Trichloroethane (TCA)	A	1.0	0.293	B	5.0	0.501	C	10	0.492	D	20	0.499	E	50	0.508
	F	100	0.539	G	200	0.578	H	500	0.655						
† 1,1,2,2-Tetrachloroethane	A	1.0	0.949	B	5.0	0.976	C	10	1.03	D	20	0.982	E	50	0.933
†	F	100	0.892	G	200	0.895	H	500	0.856						
1,1,2-Trichloroethane	A	1.0	0.698	B	5.0	0.677	C	10	0.679	D	20	0.664	E	50	0.659
	F	100	0.654	G	200	0.671	H	500	0.701						
† 1,1-Dichloroethane	A	1.0	0.609	B	5.0	0.780	C	10	0.773	D	20	0.778	E	50	0.756
†	F	100	0.789	G	200	0.814	H	500	0.860						
‡ 1,1-Dichloroethene	A	1.0	0.457	B	5.0	0.611	C	10	0.596	D	20	0.588	E	50	0.598
‡	F	100	0.612	G	200	0.620	H	500	0.650						
1,2,3-Trichlorobenzene	A	1.0	0.646	B	5.0	0.704	C	10	0.696	D	20	0.723	E	50	0.700
	F	100	0.748	G	200	0.781	H	500	0.786						
1,2,4-Trichlorobenzene	A	1.0	0.824	B	5.0	0.788	C	10	0.824	D	20	0.905	E	50	0.869
	F	100	0.932	G	200	1.01	H	500	1.11						
1,2-Dibromo-3-chloropropane (DBCP	A	1.0	0.165	B	5.0	0.198	C	10	0.204	D	20	0.207	E	50	0.188
	F	100	0.181	G	200	0.165	H	500	0.150						
1,2-Dibromoethane (EDB)	A	1.0	0.659	B	5.0	0.688	C	10	0.674	D	20	0.686	E	50	0.664
	F	100	0.660	G	200	0.668	H	500	0.723						
1,2-Dichlorobenzene	A	1.0	1.65	B	5.0	1.90	C	10	1.87	D	20	1.91	E	50	1.88
	F	100	1.93	G	200	2.03	H	500	1.99						
1,2-Dichloroethane (EDC)	A	1.0	0.520	B	5.0	0.539	C	10	0.542	D	20	0.527	E	50	0.523
	F	100	0.545	G	200	0.562	H	500	0.576						
1,2-Dichloroethane-d4	A	50	0.297	B	50	0.294	C	50	0.302	D	50	0.288	E	50	0.289
	F	50	0.285	G	50	0.286	H	50	0.273						
‡ 1,2-Dichloropropane	A	1.0	0.460	B	5.0	0.486	C	10	0.491	D	20	0.491	E	50	0.496
‡	F	100	0.520	G	200	0.548	H	500	0.597						
1,3-Dichlorobenzene	A	1.0	1.59	B	5.0	2.13	C	10	1.97	D	20	2.04	E	50	1.99
	F	100	2.10	G	200	2.16	H	500	1.96						

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

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Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925 **ICAL Date:** 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292 **Column:** MS
Instrument ID: ms52

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
1,4-Dichlorobenzene	A	1.0	1.71	B	5.0	2.17	C	10	2.10	D	20	2.20	E	50	2.23
	F	100	2.56	G	200	2.84									
2-Butanone (MEK)				B	5.0	0.176	C	10	0.180	D	20	0.214	E	50	0.213
	F	100	0.227	G	200	0.222	H	500	0.223						
2-Hexanone				B	5.0	0.480	C	10	0.603	D	20	0.582	E	50	0.578
	F	100	0.572	G	200	0.543	H	500	0.466						
4-Bromofluorobenzene	A	50	1.05	B	50	1.07	C	50	1.03	D	50	1.05	E	50	1.05
	F	50	1.06	G	50	1.09	H	50	1.12						
4-Methyl-2-pentanone (MIBK)	A	1.0	0.684	B	5.0	0.858	C	10	0.893	D	20	0.909	E	50	0.870
	F	100	0.839	G	200	0.796	H	500	0.693						
Acetone				B	5.0	0.147	C	10	0.136	D	20	0.139	E	50	0.126
	F	100	0.130	G	200	0.129	H	500	0.122						
Benzene	A	1.0	1.34	B	5.0	1.79	C	10	1.74	D	20	1.72	E	50	1.75
	F	100	1.91	G	200	2.09	H	500	1.76						
Bromochloromethane	A	1.0	0.192	B	5.0	0.217	C	10	0.210	D	20	0.207	E	50	0.206
	F	100	0.219	G	200	0.242	H	500	0.289						
Bromodichloromethane	A	1.0	0.463	B	5.0	0.557	C	10	0.553	D	20	0.544	E	50	0.540
	F	100	0.577	G	200	0.611	H	500	0.694						
† Bromoform	A	1.0	0.218	B	5.0	0.322	C	10	0.397	D	20	0.422	E	50	0.423
†	F	100	0.439	G	200	0.459									
Bromomethane	A	1.0	0.0484	B	5.0	0.0803	C	10	0.0977	D	20	0.0948	E	50	0.109
	F	100	0.150	G	200	0.190	H	500	0.234						
Carbon Disulfide	A	1.0	0.974	B	5.0	1.21	C	10	1.19	D	20	1.17	E	50	1.15
	F	100	1.22	G	200	1.26	H	500	1.41						
Carbon Tetrachloride	A	1.0	0.232	B	5.0	0.386	C	10	0.389	D	20	0.404	E	50	0.415
	F	100	0.446	G	200	0.480	H	500	0.566						
† Chlorobenzene	A	1.0	1.80	B	5.0	2.24	C	10	2.19	D	20	2.11	E	50	2.18
†	F	100	2.22	G	200	2.33	H	500	2.19						
Chloroethane	A	1.0	0.286	B	5.0	0.372	C	10	0.470	D	20	0.452	E	50	0.398
	F	100	0.412	G	200	0.398	H	500	0.359						
‡ Chloroform	A	1.0	0.506	B	5.0	0.634	C	10	0.648	D	20	0.657	E	50	0.661
‡	F	100	0.703	G	200	0.745	H	500	0.845						
† Chloromethane	A	1.0	0.325	B	5.0	0.439	C	10	0.362	D	20	0.452	E	50	0.299
†	F	100	0.430	G	200	0.465									
cis-1,2-Dichloroethene	A	1.0	0.536	B	5.0	0.575	C	10	0.571	D	20	0.591	E	50	0.583
	F	100	0.607	G	200	0.626	H	500	0.659						

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

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Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925 **ICAL Date:** 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292 **Column:** MS
Instrument ID: ms52

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
cis-1,3-Dichloropropene	A	1.0	1.12	B	5.0	1.35	C	10	1.39	D	20	1.43	E	50	1.41
	F	100	1.38	G	200	1.34	H	500	1.36						
Cyclohexane	A	1.0	0.613	B	5.0	0.852	C	10	0.974	D	20	0.882	E	50	0.905
	F	100	0.966	G	200	1.06	H	500	0.950						
Dibromochloromethane	A	1.0	0.602	B	5.0	0.711	C	10	0.738	D	20	0.726	E	50	0.721
	F	100	0.736	G	200	0.776	H	500	0.896						
Dibromofluoromethane	A	50	0.222	B	50	0.221	C	50	0.224	D	50	0.221	E	50	0.224
	F	50	0.222	G	50	0.221	H	50	0.222						
Dichlorodifluoromethane	A	1.0	0.361	B	5.0	0.470	C	10	0.516	D	20	0.484	E	50	0.482
	F	100	0.453	G	200	0.454	H	500	0.441						
‡ Ethylbenzene	A	1.0	0.856	B	5.0	1.15	C	10	1.19	D	20	1.22	E	50	1.24
‡	F	100	1.28	G	200	1.38	H	500	1.48						
Isopropylbenzene	A	1.0	1.04	B	5.0	1.24	C	10	1.26	D	20	1.30	E	50	1.26
	F	100	1.32	G	200	1.33	H	500	1.31						
m,p-Xylenes	A	2.0	1.09	B	10	1.50	C	20	1.47	D	40	1.56	E	100	1.65
	F	200	1.86	G	400	2.04									
Methyl Acetate	A	1.0	0.371	B	5.0	0.373	C	10	0.383	D	20	0.374	E	50	0.365
	F	100	0.384	G	200	0.383	H	500	0.376						
Methyl tert-Butyl Ether	A	1.0	0.931	B	5.0	1.06	C	10	1.06	D	20	1.06	E	50	1.11
	F	100	1.19	G	200	1.35	H	500	1.44						
Methylene Chloride	A	1.0	0.439	B	5.0	0.409	C	10	0.399	D	20	0.410	E	50	0.402
	F	100	0.419	G	200	0.435	H	500	0.488						
o-Xylene	A	1.0	1.00	B	5.0	1.46	C	10	1.46	D	20	1.48	E	50	1.50
	F	100	1.62	G	200	1.81	H	500	1.79						
Styrene	A	1.0	1.49	B	5.0	2.35	C	10	2.40	D	20	2.48	E	50	2.55
	F	100	2.70	G	200	2.93	H	500	2.55						
Tetrachloroethene (PCE)	A	1.0	0.442	B	5.0	0.509	C	10	0.516	D	20	0.520	E	50	0.541
	F	100	0.560	G	200	0.620									
‡ Toluene	A	1.0	1.74	B	5.0	2.10	C	10	2.14	D	20	2.11	E	50	2.16
‡	F	100	2.29	G	200	2.44	H	500	2.14						
Toluene-d8	A	50	2.28	B	50	2.23	C	50	2.24	D	50	2.12	E	50	2.13
	F	50	1.93	G	50	1.80	H	50	1.61						
trans-1,2-Dichloroethene	A	1.0	0.432	B	5.0	0.567	C	10	0.580	D	20	0.584	E	50	0.598
	F	100	0.634	G	200	0.680	H	500	0.681						
trans-1,3-Dichloropropene	A	1.0	1.01	B	5.0	1.14	C	10	1.25	D	20	1.27	E	50	1.32
	F	100	1.38	G	200	1.41	H	500	1.20						

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
ICAL Date: 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292
Instrument ID: ms52

Column: MS

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
Trichloroethene (TCE)	A	1.0	0.273	B	5.0	0.358	C	10	0.345	D	20	0.360	E	50	0.372
	F	100	0.421	G	200	0.469									
Trichlorofluoromethane	A	1.0	0.376	B	5.0	0.530	C	10	0.543	D	20	0.489	E	50	0.503
	F	100	0.515	G	200	0.544	H	500	0.570						
Trichlorotrifluoroethane	A	1.0	0.241	B	5.0	0.321	C	10	0.322	D	20	0.318	E	50	0.319
	F	100	0.320	G	200	0.334	H	500	0.386						
‡ Vinyl Chloride	A	1.0	0.424	B	5.0	0.485	C	10	0.512	D	20	0.499	E	50	0.461
‡	F	100	0.468	G	200	0.454	H	500	0.397						

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925 **ICAL Date:** 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292 **Column:** MS
Instrument ID: ms52

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
1,1,1,2-Tetrachloroethane	MS	AverageRF	% RSD	14.0		≤ 15	0.663		0.01
1,1,1-Trichloroethane (TCA)	MS	Linear	R2	0.997		≥ 0.99	0.508		0.01
† 1,1,2,2-Tetrachloroethane	MS	AverageRF	% RSD	6.0		≤ 15	0.939		0.3
1,1,2-Trichloroethane	MS	AverageRF	% RSD	2.5		≤ 15	0.675		0.01
† 1,1-Dichloroethane	MS	AverageRF	% RSD	9.4		≤ 15	0.770		0.1
‡ 1,1-Dichloroethene	MS	AverageRF	% RSD	9.8		≤ 15	0.591		0.01
1,2,3-Trichlorobenzene	MS	AverageRF	% RSD	6.5		≤ 15	0.723		0.01
1,2,4-Trichlorobenzene	MS	AverageRF	% RSD	11.9		≤ 15	0.908		0.01
1,2-Dibromo-3-chloropropane (DBCP)	MS	AverageRF	% RSD	11.3		≤ 15	0.182		0.01
1,2-Dibromoethane (EDB)	MS	AverageRF	% RSD	3.2		≤ 15	0.678		0.01
1,2-Dichlorobenzene	MS	AverageRF	% RSD	6.0		≤ 15	1.89		0.01
1,2-Dichloroethane (EDC)	MS	AverageRF	% RSD	3.6		≤ 15	0.542		0.01
1,2-Dichloroethane-d4	SURR	AverageRF	% RSD	3.0		≤ 15	0.289		
‡ 1,2-Dichloropropane	MS	AverageRF	% RSD	8.5		≤ 15	0.511		0.01
1,3-Dichlorobenzene	MS	AverageRF	% RSD	9.1		≤ 15	1.99		0.01
1,4-Dichlorobenzene	MS	Linear	R2	0.996		≥ 0.99	2.26		0.01
2-Butanone (MEK)	MS	AverageRF	% RSD	10.2		≤ 15	0.208		0.01
2-Hexanone	MS	AverageRF	% RSD	9.8		≤ 15	0.546		0.01
4-Bromofluorobenzene	SURR	AverageRF	% RSD	2.7		≤ 15	1.06		
4-Methyl-2-pentanone (MIBK)	MS	AverageRF	% RSD	10.6		≤ 15	0.818		0.01
Acetone	MS	AverageRF	% RSD	6.3		≤ 15	0.133		0.01
Benzene	MS	AverageRF	% RSD	11.9		≤ 15	1.76		0.01
Bromochloromethane	MS	AverageRF	% RSD	13.7		≤ 15	0.223		0.01
Bromodichloromethane	MS	AverageRF	% RSD	11.7		≤ 15	0.567		0.01
† Bromoform	MS	Linear	R2	0.999		≥ 0.99	0.383		0.1
Bromomethane	MS	Quadratic	COD	0.999		≥ 0.99	0.126		0.01
Carbon Disulfide	MS	AverageRF	% RSD	10.1		≤ 15	1.20		0.01
Carbon Tetrachloride	MS	Linear	R2	0.996		≥ 0.99	0.415		0.01
† Chlorobenzene	MS	AverageRF	% RSD	7.3		≤ 15	2.16		0.3
Chloroethane	MS	AverageRF	% RSD	14.5		≤ 15	0.393		0.01
‡ Chloroform	MS	AverageRF	% RSD	14.4		≤ 15	0.675		0.01
† Chloromethane	MS	Linear	R2	0.992		≥ 0.99	0.396		0.1
cis-1,2-Dichloroethene	MS	AverageRF	% RSD	6.3		≤ 15	0.593		0.01
cis-1,3-Dichloropropene	MS	AverageRF	% RSD	7.2		≤ 15	1.35		0.01
Cyclohexane	MS	AverageRF	% RSD	14.7		≤ 15	0.900		0.01
Dibromochloromethane	MS	AverageRF	% RSD	11.0		≤ 15	0.738		0.01
Dibromofluoromethane	SURR	AverageRF	% RSD	0.6	*	≤ 15	0.222		
Dichlorodifluoromethane	MS	AverageRF	% RSD	10.0	ok	≤ 15	0.458		0.01
‡ Ethylbenzene	MS	AverageRF	% RSD	15.1	*	≤ 15	1.22		0.01
Isopropylbenzene	MS	AverageRF	% RSD	7.4		≤ 15	1.26		0.01
m,p-Xylenes	MS	Linear	R2	0.997		≥ 0.99	1.59		0.01
Methyl Acetate	MS	AverageRF	% RSD	1.8		≤ 15	0.376		0.01

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

* CCC criteria ≤ 30%

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Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925 **ICAL Date:** 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292 **Column:** MS
Instrument ID: ms52

Analyte Name	Compound Type	Calibration Evaluation: Fit Type	Eval.	Eval. Result	Q	Control Criteria	RRF Evaluation: Average RRF	Q	Minimum RRF
Methyl tert-Butyl Ether	MS	AverageRF	% RSD	14.6		≤ 15	1.15		0.01
Methylene Chloride	MS	AverageRF	% RSD	6.9		≤ 15	0.425		0.01
o-Xylene	MS	Linear	R2	0.999		≥ 0.99	1.52		0.01
Styrene	MS	Linear	R2	0.997		≥ 0.99	2.43		0.01
Tetrachloroethene (PCE)	MS	AverageRF	% RSD	10.2		≤ 15	0.529		0.01
‡ Toluene	MS	AverageRF	% RSD	9.2		≤ 15	2.14		0.01
Toluene-d8	SURR	AverageRF	% RSD	11.7		≤ 15	2.04		
trans-1,2-Dichloroethene	MS	AverageRF	% RSD	13.3		≤ 15	0.594		0.01
trans-1,3-Dichloropropene	MS	AverageRF	% RSD	10.5		≤ 15	1.25		0.01
Trichloroethene (TCE)	MS	Linear	R2	0.996		≥ 0.99	0.371		0.01
Trichlorofluoromethane	MS	AverageRF	% RSD	11.7		≤ 15	0.509		0.01
Trichlorotrifluoroethane	MS	AverageRF	% RSD	12.2		≤ 15	0.320		0.01
‡ Vinyl Chloride	MS	AverageRF	% RSD	8.2		≤ 15	0.462		0.01

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
ICAL Date: 11/28/2014
Date Analyzed: 11/29/2014

Second Source Calibration Verification
Volatile Organic Compounds by GC/MS

ICAL Type: Internal Standard
Analysis Method: 8260B

ICAL ID: CAL3292
Units: ug/L

File ID: I:\MS52\DATA\MS52-141128\1128-023.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
1,1,1,2-Tetrachloroethane	100	110	0.663	0.697	5	NA	± 30 %	AverageRF
1,1,1-Trichloroethane (TCA)	100	91	0.508	0.545	NA	-9	± 30 %	Linear
† 1,1,2,2-Tetrachloroethane	100	93	0.939	0.875	-7	NA	± 30 %	AverageRF
1,1,2-Trichloroethane	100	98	0.675	0.664	-2	NA	± 30 %	AverageRF
† 1,1-Dichloroethane	100	100	0.770	0.788	2	NA	± 30 %	AverageRF
‡ 1,1-Dichloroethene	100	100	0.591	0.601	2	NA	± 30 %	AverageRF
1,2,3-Trichlorobenzene	100	100	0.723	0.758	5	NA	± 30 %	AverageRF
1,2,4-Trichlorobenzene	100	110	0.908	0.971	7	NA	± 30 %	AverageRF
1,2-Dibromo-3-chloropropane (DBCP	100	97	0.182	0.177	-3	NA	± 30 %	AverageRF
1,2-Dibromoethane (EDB)	100	100	0.678	0.680	0	NA	± 30 %	AverageRF
1,2-Dichlorobenzene	100	110	1.89	1.99	5	NA	± 30 %	AverageRF
1,2-Dichloroethane (EDC)	100	95	0.542	0.517	-5	NA	± 30 %	AverageRF
‡ 1,2-Dichloropropane	100	99	0.511	0.506	-1	NA	± 30 %	AverageRF
1,3-Dichlorobenzene	100	110	1.99	2.16	8	NA	± 30 %	AverageRF
1,4-Dichlorobenzene	100	95	2.26	2.57	NA	-5	± 30 %	Linear
2-Butanone (MEK)	100	94	0.208	0.196	-6	NA	± 30 %	AverageRF
2-Hexanone	100	96	0.546	0.524	-4	NA	± 30 %	AverageRF
4-Methyl-2-pentanone (MIBK)	100	96	0.818	0.785	-4	NA	± 30 %	AverageRF
Acetone	100	89	0.133	0.118	-11	NA	± 30 %	AverageRF
Benzene	100	110	1.76	1.90	8	NA	± 30 %	AverageRF
Bromochloromethane	100	98	0.223	0.219	-2	NA	± 30 %	AverageRF
Bromodichloromethane	100	100	0.567	0.565	0	NA	± 30 %	AverageRF
† Bromoform	100	97	0.383	0.436	NA	-3	± 30 %	Linear
Bromomethane	100	100	0.126	0.161	NA	0	± 30 %	Quadratic
Carbon Disulfide	100	100	1.20	1.22	2	NA	± 30 %	AverageRF
Carbon Tetrachloride	100	87	0.415	0.438	NA	-13	± 30 %	Linear
† Chlorobenzene	100	110	2.16	2.29	6	NA	± 30 %	AverageRF
Chloroethane	100	99	0.393	0.391	-1	NA	± 30 %	AverageRF
‡ Chloroform	100	100	0.675	0.688	2	NA	± 30 %	AverageRF
† Chloromethane	100	85	0.396	0.376	NA	-15	± 30 %	Linear
cis-1,2-Dichloroethene	100	100	0.593	0.593	0	NA	± 30 %	AverageRF
cis-1,3-Dichloropropene	100	110	1.35	1.42	5	NA	± 30 %	AverageRF
Cyclohexane	100	100	0.900	0.934	4	NA	± 30 %	AverageRF
Dibromochloromethane	100	100	0.738	0.751	2	NA	± 30 %	AverageRF
Dichlorodifluoromethane	100	94	0.458	0.432	-6	NA	± 30 %	AverageRF
‡ Ethylbenzene	100	110	1.22	1.34	9	NA	± 30 %	AverageRF
Isopropylbenzene	100	110	1.26	1.40	11	NA	± 30 %	AverageRF
m,p-Xylenes	200	190	1.59	1.88	NA	-4	± 30 %	Linear
Methyl Acetate	100	92	0.376	0.346	-8	NA	± 30 %	AverageRF
Methyl tert-Butyl Ether	100	100	1.15	1.18	3	NA	± 30 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
ICAL Date: 11/28/2014
Date Analyzed: 11/29/2014

Second Source Calibration Verification
Volatile Organic Compounds by GC/MS

ICAL Type: Internal Standard
Analysis Method: 8260B

ICAL ID: CAL3292
Units: ug/L

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
Methylene Chloride	100	98	0.425	0.416	-2	NA	± 30 %	AverageRF
o-Xylene	100	95	1.52	1.65	NA	-5	± 30 %	Linear
Styrene	100	110	2.43	2.79	NA	5	± 30 %	Linear
Tetrachloroethene (PCE)	100	110	0.529	0.603	14	NA	± 30 %	AverageRF
‡ Toluene	100	110	2.14	2.37	11	NA	± 30 %	AverageRF
trans-1,2-Dichloroethene	100	110	0.594	0.625	5	NA	± 30 %	AverageRF
trans-1,3-Dichloropropene	100	110	1.25	1.37	10	NA	± 30 %	AverageRF
Trichloroethene (TCE)	100	94	0.371	0.423	NA	-6	± 30 %	Linear
Trichlorofluoromethane	100	100	0.509	0.518	2	NA	± 30 %	AverageRF
Trichlorotrifluoroethane	100	99	0.320	0.318	-1	NA	± 30 %	AverageRF
‡ Vinyl Chloride	100	89	0.462	0.409	-11	NA	± 30 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
Date Analyzed: 12/23/2014

Continuing Calibration Verification Summary
Volatile Organic Compounds by GC/MS

ICAL Type: Internal Standard
Analysis Method: 8260B

ICAL Date: 11/28/2014
ICAL ID: CAL3292
Analysis Lot: JWG1500319
Units: ug/L

File ID: I:\MS52\DATA\MS52-141223\1223-002.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D		%Drift	Criteria	Curve Fit
1,1,1,2-Tetrachloroethane	50	47	0.01	0.663	0.619	-7		NA	± 30 %	AverageRF
1,1,1-Trichloroethane (TCA)	50	42	0.01	0.508	0.458	NA		-15	± 30 %	Linear
† 1,1,2,2-Tetrachloroethane	50	50	0.3	0.939	0.947	1		NA	± 30 %	AverageRF
1,1,2-Trichloroethane	50	46	0.01	0.675	0.626	-7		NA	± 30 %	AverageRF
† 1,1-Dichloroethane	50	48	0.1	0.770	0.732	-5		NA	± 30 %	AverageRF
‡ 1,1-Dichloroethene	50	47	0.01	0.591	0.554	-6		NA	± 20 %	AverageRF
1,2,3-Trichlorobenzene	50	49	0.01	0.723	0.705	-2		NA	± 30 %	AverageRF
1,2,4-Trichlorobenzene	50	47	0.01	0.908	0.855	-6		NA	± 30 %	AverageRF
1,2-Dibromo-3-chloropropane (DBCP	50	49	0.01	0.182	0.177	-3		NA	± 30 %	AverageRF
1,2-Dibromoethane (EDB)	50	47	0.01	0.678	0.639	-6		NA	± 30 %	AverageRF
1,2-Dichlorobenzene	50	47	0.01	1.89	1.80	-5		NA	± 30 %	AverageRF
1,2-Dichloroethane (EDC)	50	48	0.01	0.542	0.519	-4		NA	± 30 %	AverageRF
1,2-Dichloroethane-d4	50	50		0.289	0.287	-1		NA	± 30 %	AverageRF
‡ 1,2-Dichloropropane	50	46	0.01	0.511	0.469	-8		NA	± 20 %	AverageRF
1,3-Dichlorobenzene	50	47	0.01	1.99	1.88	-6		NA	± 30 %	AverageRF
1,4-Dichlorobenzene	50	40	0.01	2.26	2.06	NA		-19	± 30 %	Linear
2-Butanone (MEK)	50	45	0.01	0.208	0.188	-10		NA	± 30 %	AverageRF
2-Hexanone	50	52	0.01	0.546	0.567	4		NA	± 30 %	AverageRF
4-Bromofluorobenzene	50	49		1.06	1.04	-2		NA	± 30 %	AverageRF
4-Methyl-2-pentanone (MIBK)	50	52	0.01	0.818	0.845	3		NA	± 30 %	AverageRF
Acetone	50	45	0.01	0.133	0.120	-9		NA	± 30 %	AverageRF
Benzene	50	46	0.01	1.76	1.63	-8		NA	± 30 %	AverageRF
Bromochloromethane	50	45	0.01	0.223	0.203	-9		NA	± 30 %	AverageRF
Bromodichloromethane	50	45	0.01	0.567	0.509	-10		NA	± 30 %	AverageRF
† Bromoform	50	46	0.1	0.383	0.406	NA		-8	± 30 %	Linear
Bromomethane	50	43	0.01	0.126	0.121	NA		-14	± 30 %	Quadratic
Carbon Disulfide	50	47	0.01	1.20	1.12	-7		NA	± 30 %	AverageRF
Carbon Tetrachloride	50	44	0.01	0.415	0.391	NA		-12	± 30 %	Linear
† Chlorobenzene	50	47	0.3	2.16	2.03	-6		NA	± 30 %	AverageRF
Chloroethane	50	42	0.01	0.393	0.332	-16		NA	± 30 %	AverageRF
‡ Chloroform	50	46	0.01	0.675	0.624	-8		NA	± 20 %	AverageRF
† Chloromethane	50	42	0.1	0.396	0.357	NA		-15	± 30 %	Linear
cis-1,2-Dichloroethene	50	48	0.01	0.593	0.568	-4		NA	± 30 %	AverageRF
cis-1,3-Dichloropropene	50	50	0.01	1.35	1.34	0		NA	± 30 %	AverageRF
Cyclohexane	50	45	0.01	0.900	0.804	-11		NA	± 30 %	AverageRF
Dibromochloromethane	50	46	0.01	0.738	0.686	-7		NA	± 30 %	AverageRF
Dibromofluoromethane	50	49		0.222	0.218	-2		NA	± 30 %	AverageRF
Dichlorodifluoromethane	50	20	0.01	0.458	0.186	-59	*	NA	± 30 %	AverageRF
‡ Ethylbenzene	50	46	0.01	1.22	1.12	-9		NA	± 20 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

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Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
Date Analyzed: 12/23/2014

Continuing Calibration Verification Summary
Volatile Organic Compounds by GC/MS

ICAL Type: Internal Standard
Analysis Method: 8260B

ICAL Date: 11/28/2014
ICAL ID: CAL3292
Analysis Lot: JWG1500319
Units: ug/L

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Isopropylbenzene	50	46	0.01	1.26	1.15	-9	NA	± 30 %	AverageRF
m,p-Xylenes	100	80	0.01	1.59	1.47	NA	-20	± 30 %	Linear
Methyl Acetate	50	46	0.01	0.376	0.348	-7	NA	± 30 %	AverageRF
Methyl tert-Butyl Ether	50	45	0.01	1.15	1.03	-11	NA	± 30 %	AverageRF
Methylene Chloride	50	45	0.01	0.425	0.382	-10	NA	± 30 %	AverageRF
o-Xylene	50	43	0.01	1.52	1.43	NA	-14	± 30 %	Linear
Styrene	50	44	0.01	2.43	2.39	NA	-13	± 30 %	Linear
Tetrachloroethene (PCE)	50	46	0.01	0.529	0.486	-8	NA	± 30 %	AverageRF
‡ Toluene	50	46	0.01	2.14	1.97	-8	NA	± 20 %	AverageRF
Toluene-d8	50	50		2.04	2.05	0	NA	± 30 %	AverageRF
trans-1,2-Dichloroethene	50	47	0.01	0.594	0.561	-6	NA	± 30 %	AverageRF
trans-1,3-Dichloropropene	50	50	0.01	1.25	1.24	-1	NA	± 30 %	AverageRF
Trichloroethene (TCE)	50	41	0.01	0.371	0.342	NA	-19	± 30 %	Linear
Trichlorofluoromethane	50	39	0.01	0.509	0.399	-22	NA	± 30 %	AverageRF
Trichlorotrifluoroethane	50	48	0.01	0.320	0.307	-4	NA	± 30 %	AverageRF
‡ Vinyl Chloride	50	53	0.01	0.462	0.489	6	NA	± 20 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925

Analysis Run Log
Volatile Organic Compounds by GC/MS

Analysis Method: 8260B **Analysis Lot:** JWG1500319
Instrument ID: ms52

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
1223-001.D	GC/MS Tuning - Bromofluorobenzene	JWG1500319-1	12/23/2014	12:03		12/23/2014	12:19
1223-002.D	Continuing Calibration Verification	JWG1500319-2	12/23/2014	12:30		12/23/2014	12:46
1223-003.D	Lab Control Sample	JWG1500320-1	12/23/2014	12:57		12/23/2014	13:13
1223-004.D	Duplicate Lab Control Sample	JWG1500320-2	12/23/2014	13:25		12/23/2014	13:41
1223-007.D	Method Blank	JWG1500320-3	12/23/2014	14:50		12/23/2014	15:06
1223-008.D	39A-21ST-TB-121214	J1409737-010	12/23/2014	15:17		12/23/2014	15:33
1223-009.D	39A-21ST-MW00119S-017.5-20141213	J1409737-001	12/23/2014	15:45		12/23/2014	16:01
1223-010.D	39A-21ST-MW0021S-017.5-20141213	J1409737-002	12/23/2014	16:12		12/23/2014	16:28
1223-011.D	39A-21ST-MW0018S-015.5-20141213	J1409737-003	12/23/2014	16:39		12/23/2014	16:55
1223-012.D	39A-21ST-MW0017S-016.5-20141213	J1409737-004	12/23/2014	17:06		12/23/2014	17:22
1223-013.D	39A-21ST-MW0017I-032.5-20141213	J1409737-005	12/23/2014	17:33		12/23/2014	17:49
1223-014.D	39A-21ST-MW0031I-025.5-20141213	J1409737-006	12/23/2014	18:01		12/23/2014	18:17
1223-015.D	39A-21ST-MW0032I-025.5-20141213	J1409737-007	12/23/2014	18:28		12/23/2014	18:44
1223-016.D	39A-21ST-MW0023S-017.5-20141213	J1409737-008	12/23/2014	18:55		12/23/2014	19:11
1223-017.D	39A-21ST-MW0023I-032.5-20141213	J1409737-009	12/23/2014	19:22		12/23/2014	19:38
1223-018.D	39A-21ST-MW0014I-024.5-20141214	J1409737-011	12/23/2014	19:49		12/23/2014	20:05
1223-019.D	39A-21ST-MW0015I-038.5-20141214	J1409737-012	12/23/2014	20:17		12/23/2014	20:33
1223-020.D	39A-21ST-MW0030I-02.5-20141214	J1409737-013	12/23/2014	20:44		12/23/2014	21:00
1223-021.D	39A-21ST-MW0025S-014.5-20141214	J1409737-014	12/23/2014	21:12		12/23/2014	21:28
1223-022.D	39A-21ST-MW0026S-017.5-20141214	J1409737-015	12/23/2014	21:39		12/23/2014	21:55
1223-023.D	39A-21ST-MW0028I-024.5-20141214	J1409737-016	12/23/2014	22:06		12/23/2014	22:22
1223-024.D	39A-DBA-IW0003S-012.0-20141215	J1409737-017	12/23/2014	22:33		12/23/2014	22:49
1223-025.D	39A-DBA-IW0003I-035.5-20141215	J1409737-018	12/23/2014	23:00		12/23/2014	23:16

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

QA/QC Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Extracted: 12/23/2014

Extraction Prep Log
Volatile Organic Compounds by GC/MS

Extraction Method: EPA 5030B
Analysis Method: 8260B

Extraction Lot: JWG1500320
Level: Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
39A-21ST-MW00119S-017.5-2	J1409737-001	12/13/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0021S-017.5-20	J1409737-002	12/13/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0018S-015.5-20	J1409737-003	12/13/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0017S-016.5-20	J1409737-004	12/13/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0017I-032.5-20	J1409737-005	12/13/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0031I-025.5-20	J1409737-006	12/13/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0032I-025.5-20	J1409737-007	12/13/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0023S-017.5-20	J1409737-008	12/13/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0023I-032.5-20	J1409737-009	12/13/14	12/16/14	5ml	5ml	NA	
39A-21ST-TB-121214	J1409737-010	12/13/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0014I-024.5-20	J1409737-011	12/14/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0015I-038.5-20	J1409737-012	12/14/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0030I-02.5-201	J1409737-013	12/14/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0025S-014.5-20	J1409737-014	12/14/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0026S-017.5-20	J1409737-015	12/14/14	12/16/14	5ml	5ml	NA	
39A-21ST-MW0028I-024.5-20	J1409737-016	12/14/14	12/16/14	5ml	5ml	NA	
39A-DBA-IW0003S-012.0-201	J1409737-017	12/15/14	12/16/14	5ml	5ml	NA	
39A-DBA-IW0003I-035.5-201	J1409737-018	12/15/14	12/16/14	5ml	5ml	NA	
Method Blank	JWG1500320-3	NA	NA	5ml	5ml	NA	
Lab Control Sample	JWG1500320-1	NA	NA	5ml	5ml	NA	
Duplicate Lab Control Sample	JWG1500320-2	NA	NA	5ml	5ml	NA	

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

Validation Package

9143 Philips Highway, Suite 200
Jacksonville, Florida 32256
Phone: (904) 739-2277 Fax (904) 739-2011
www.alsglobal.com

Organic Analysis:
Volatile Organic Compounds by GC/MS

Validation Package

Organic Analysis:
Volatile Organic Compounds by GC/MS

Validation Package

QC Reports

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737

Surrogate Recovery Summary
Volatile Organic Compounds by GC/MS

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: Percent
Level: Low

Sample Name	Lab Code	Sur1	Sur2	Sur3	Sur4
39A-21ST-MW00119S-017.5-201	J1409737-001	105	97	102	107
39A-21ST-MW0021S-017.5-2014	J1409737-002	105	101	101	107
39A-21ST-MW0018S-015.5-2014	J1409737-003	104	99	106	109
39A-21ST-MW0017S-016.5-2014	J1409737-004	105	99	106	107
39A-21ST-MW0017I-032.5-2014	J1409737-005	106	97	102	107
39A-21ST-MW0031I-025.5-2014	J1409737-006	107	98	98	108
39A-21ST-MW0032I-025.5-2014	J1409737-007	110	99	102	107
39A-21ST-MW0023S-017.5-2014	J1409737-008	106	96	105	110
39A-21ST-MW0023I-032.5-2014	J1409737-009	110	100	103	108
39A-21ST-TB-121214	J1409737-010	102	100	102	110
39A-21ST-MW0014I-024.5-2014	J1409737-011	102	97	99	108
39A-21ST-MW0015I-038.5-2014	J1409737-012	111	100	104	109
39A-21ST-MW0030I-02.5-20141	J1409737-013	106	98	106	108
39A-21ST-MW0025S-014.5-2014	J1409737-014	103	99	100	108
39A-21ST-MW0026S-017.5-2014	J1409737-015	106	100	100	109
39A-21ST-MW0028I-024.5-2014	J1409737-016	104	100	106	106
39A-DBA-IW0003S-012.0-20141	J1409737-017	109	103	103	109
39A-DBA-IW0003I-035.5-20141	J1409737-018	111	101	105	107
Method Blank	JWG1500320-3	104	99	100	111
Lab Control Sample	JWG1500320-1	97	103	99	103
Duplicate Lab Control Sample	JWG1500320-2	97	99	100	105

Surrogate Recovery Control Limits (%)

Sur1 = 1,2-Dichloroethane-d4	72-121
Sur2 = 4-Bromofluorobenzene	86-113
Sur3 = Dibromofluoromethane	86-112
Sur4 = Toluene-d8	88-115

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
Date Analyzed: 12/23/2014
Time Analyzed: 12:30

Internal Standard Area and RT Summary
Volatile Organic Compounds by GC/MS

File ID: I:\MS52\DATA\MS52-141223\1223-002.D
Instrument ID: ms52
Analysis Method: 8260B

Lab Code: JWG1500319-2
Analysis Lot: JWG1500319

		1,4-Dichlorobenzene-d4		Chlorobenzene-d5		Fluorobenzene	
		Area	RT	Area	RT	Area	RT
ICAL Average ==>		430,327	13.67	517,196	11.27	952,284	8.15
Upper Limit ==>		860,654	14.17	1,034,393	11.77	1,904,569	8.65
Lower Limit ==>		215,164	13.17	258,598	10.77	476,142	7.65
Associated Analyses							
Continuing Calibration Verification	JWG1500319-2	552,311	13.67	678,364	11.27	1,303,711	8.15
Lab Control Sample	JWG1500320-1	570,357	13.67	722,806	11.27	1,392,513	8.15
Duplicate Lab Control Sample	JWG1500320-2	615,580	13.67	737,241	11.27	1,442,456	8.15
Method Blank	JWG1500320-3	449,688	13.67	603,816	11.27	1,236,744	8.15
39A-21ST-TB-121214	J1409737-010	422,680	13.67	574,952	11.27	1,192,926	8.15
39A-21ST-MW00119S-017.5-2014	J1409737-001	408,349	13.67	564,007	11.27	1,141,576	8.15
39A-21ST-MW0021S-017.5-20141	J1409737-002	384,161	13.67	540,787	11.27	1,086,442	8.15
39A-21ST-MW0018S-015.5-20141	J1409737-003	381,036	13.67	516,899	11.27	1,072,269	8.15
39A-21ST-MW0017S-016.5-20141	J1409737-004	382,566	13.67	528,367	11.27	1,060,454	8.15
39A-21ST-MW0017I-032.5-20141	J1409737-005	374,875	13.67	507,626	11.27	1,027,652	8.15
39A-21ST-MW0031I-025.5-20141	J1409737-006	369,856	13.67	501,750	11.27	1,039,669	8.15
39A-21ST-MW0032I-025.5-20141	J1409737-007	367,551	13.67	502,617	11.27	1,010,178	8.15
39A-21ST-MW0023S-017.5-20141	J1409737-008	368,915	13.67	488,009	11.27	996,272	8.15
39A-21ST-MW0023I-032.5-20141	J1409737-009	360,195	13.67	496,593	11.27	1,006,483	8.15
39A-21ST-MW0014I-024.5-20141	J1409737-011	367,631	13.67	516,867	11.27	1,062,469	8.15
39A-21ST-MW0015I-038.5-20141	J1409737-012	349,257	13.67	488,752	11.27	979,594	8.15
39A-21ST-MW0030I-02.5-201412	J1409737-013	358,012	13.67	495,792	11.27	1,001,006	8.15
39A-21ST-MW0025S-014.5-20141	J1409737-014	354,848	13.67	490,040	11.27	996,678	8.15
39A-21ST-MW0026S-017.5-20141	J1409737-015	345,231	13.67	475,351	11.27	977,360	8.15
39A-21ST-MW0028I-024.5-20141	J1409737-016	346,755	13.67	492,325	11.27	986,282	8.15
39A-DBA-IW0003S-012.0-201412	J1409737-017	339,278	13.67	480,384	11.27	980,584	8.15
39A-DBA-IW0003I-035.5-2014121	J1409737-018	332,772	13.67	477,730	11.27	956,754	8.15

Results flagged with an asterisk (*) indicate values outside control criteria.

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Extracted: 12/23/2014
Date Analyzed: 12/23/2014

Lab Control Spike/Duplicate Lab Control Spike Summary
Volatile Organic Compounds by GC/MS

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: JWG1500320

	Lab Control Sample JWG1500320-1 Lab Control Spike			Duplicate Lab Control Sample JWG1500320-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
1,1,1,2-Tetrachloroethane	48.0	50.0	96	48.9	50.0	98	77-118	2	30
1,1,1-Trichloroethane (TCA)	44.1	50.0	88	46.0	50.0	92	70-122	4	30
1,1,2,2-Tetrachloroethane	51.2	50.0	102	49.8	50.0	100	66-135	3	30
1,1,2-Trichloroethane	48.2	50.0	96	48.9	50.0	98	75-122	1	30
1,1-Dichloroethane	48.5	50.0	97	50.1	50.0	100	79-117	3	30
1,1-Dichloroethene	48.3	50.0	97	50.8	50.0	102	72-128	5	30
1,2,3-Trichlorobenzene	53.8	50.0	108	54.0	50.0	108	62-136	0	30
1,2,4-Trichlorobenzene	51.2	50.0	102	51.4	50.0	103	66-127	0	30
1,2-Dibromo-3-chloropropane (DBCP	54.3	50.0	109	51.5	50.0	103	60-122	5	30
1,2-Dibromoethane (EDB)	50.0	50.0	100	49.5	50.0	99	76-118	1	30
1,2-Dichlorobenzene	49.2	50.0	98	47.8	50.0	96	81-115	3	30
1,2-Dichloroethane (EDC)	49.2	50.0	98	50.0	50.0	100	70-117	2	30
1,2-Dichloropropane	47.5	50.0	95	48.6	50.0	97	79-117	2	30
1,3-Dichlorobenzene	49.2	50.0	98	48.3	50.0	97	82-116	2	30
1,4-Dichlorobenzene	42.3	50.0	85	42.6	50.0	85	82-115	1	30
2-Butanone (MEK)	47.2	50.0	94	48.9	50.0	98	62-138	3	30
2-Hexanone	52.5	50.0	105	50.5	50.0	101	74-127	4	30
4-Methyl-2-pentanone (MIBK)	53.0	50.0	106	52.2	50.0	104	77-120	1	30
Acetone	45.8	50.0	92	40.3	50.0	81	42-161	13	30
Benzene	47.9	50.0	96	49.1	50.0	98	80-117	3	30
Bromochloromethane	47.1	50.0	94	47.8	50.0	96	78-118	2	30
Bromodichloromethane	46.4	50.0	93	46.4	50.0	93	75-118	0	30
Bromoform	49.0	50.0	98	47.6	50.0	95	63-121	3	30
Bromomethane	46.8	50.0	94	53.7	50.0	107	31-153	14	30
Carbon Disulfide	47.6	50.0	95	50.5	50.0	101	72-128	6	30
Carbon Tetrachloride	44.4	50.0	89	46.6	50.0	93	67-124	5	30
Chlorobenzene	48.8	50.0	98	50.6	50.0	101	83-118	4	30
Chloroethane	43.3	50.0	87	34.2	50.0	68	68-132	24	30
Chloroform	48.1	50.0	96	49.2	50.0	98	77-116	2	30
Chloromethane	43.2	50.0	86	38.6	50.0	77	60-128	11	30
cis-1,2-Dichloroethene	49.1	50.0	98	50.0	50.0	100	78-117	2	30
cis-1,3-Dichloropropene	51.4	50.0	103	52.5	50.0	105	80-119	2	30
Cyclohexane	45.9	50.0	92	47.0	50.0	94	75-124	2	30
Dibromochloromethane	47.5	50.0	95	48.3	50.0	97	74-121	2	30
Dichlorodifluoromethane	19.1	50.0	38 *	20.9	50.0	42 *	49-132	9	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Extracted: 12/23/2014
Date Analyzed: 12/23/2014

Lab Control Spike/Duplicate Lab Control Spike Summary
Volatile Organic Compounds by GC/MS

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low
Extraction Lot: JWG1500320

	Lab Control Sample JWG1500320-1 Lab Control Spike			Duplicate Lab Control Sample JWG1500320-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Ethylbenzene	47.3	50.0	95	50.4	50.0	101	82-119	6	30
Isopropylbenzene	49.8	50.0	100	48.9	50.0	98	78-119	2	30
m,p-Xylenes	84.3	100	84	88.5	100	89	79-122	5	30
Methyl Acetate	46.9	50.0	94	45.1	50.0	90	50-137	4	30
Methyl tert-Butyl Ether	46.5	50.0	93	45.5	50.0	91	73-118	2	30
Methylene Chloride	47.5	50.0	95	46.5	50.0	93	75-123	2	30
o-Xylene	43.8	50.0	88	45.8	50.0	92	80-119	4	30
Styrene	44.6	50.0	89	46.8	50.0	94	80-121	5	30
Tetrachloroethene (PCE)	48.3	50.0	97	51.4	50.0	103	75-126	6	30
Toluene	48.0	50.0	96	50.5	50.0	101	52-152	5	30
trans-1,2-Dichloroethene	48.8	50.0	98	51.6	50.0	103	75-121	6	30
trans-1,3-Dichloropropene	51.0	50.0	102	51.8	50.0	104	76-118	2	30
Trichloroethene (TCE)	42.3	50.0	85	44.8	50.0	90	78-122	6	30
Trichlorofluoromethane	41.1	50.0	82	42.2	50.0	84	58-134	3	30
Trichlorotrifluoroethane	50.4	50.0	101	52.5	50.0	105	77-128	4	30
Vinyl Chloride	48.9	50.0	98	51.8	50.0	104	69-138	6	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Extracted: 12/23/2014
Date Analyzed: 12/23/2014
Time Analyzed: 14:50

Method Blank Summary
Volatile Organic Compounds by GC/MS

Sample Name: Method Blank
Lab Code: JWG1500320-3

Extraction Method: EPA 5030B
Analysis Method: 8260B

Instrument ID: ms52
File ID: I:\MS52\DATA\MS52-141223\1223-007.D

Level: Low
Extraction Lot: JWG1500320

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	JWG1500320-1	I:\MS52\DATA\MS52-141223\1223-003.D	12/23/14	12:57
Duplicate Lab Control Sample	JWG1500320-2	I:\MS52\DATA\MS52-141223\1223-004.D	12/23/14	13:25
39A-21ST-TB-121214	J1409737-010	I:\MS52\DATA\MS52-141223\1223-008.D	12/23/14	15:17
39A-21ST-MW00119S-017.5-20141213	J1409737-001	I:\MS52\DATA\MS52-141223\1223-009.D	12/23/14	15:45
39A-21ST-MW0021S-017.5-20141213	J1409737-002	I:\MS52\DATA\MS52-141223\1223-010.D	12/23/14	16:12
39A-21ST-MW0018S-015.5-20141213	J1409737-003	I:\MS52\DATA\MS52-141223\1223-011.D	12/23/14	16:39
39A-21ST-MW0017S-016.5-20141213	J1409737-004	I:\MS52\DATA\MS52-141223\1223-012.D	12/23/14	17:06
39A-21ST-MW0017I-032.5-20141213	J1409737-005	I:\MS52\DATA\MS52-141223\1223-013.D	12/23/14	17:33
39A-21ST-MW0031I-025.5-20141213	J1409737-006	I:\MS52\DATA\MS52-141223\1223-014.D	12/23/14	18:01
39A-21ST-MW0032I-025.5-20141213	J1409737-007	I:\MS52\DATA\MS52-141223\1223-015.D	12/23/14	18:28
39A-21ST-MW0023S-017.5-20141213	J1409737-008	I:\MS52\DATA\MS52-141223\1223-016.D	12/23/14	18:55
39A-21ST-MW0023I-032.5-20141213	J1409737-009	I:\MS52\DATA\MS52-141223\1223-017.D	12/23/14	19:22
39A-21ST-MW0014I-024.5-20141214	J1409737-011	I:\MS52\DATA\MS52-141223\1223-018.D	12/23/14	19:49
39A-21ST-MW0015I-038.5-20141214	J1409737-012	I:\MS52\DATA\MS52-141223\1223-019.D	12/23/14	20:17
39A-21ST-MW0030I-02.5-20141214	J1409737-013	I:\MS52\DATA\MS52-141223\1223-020.D	12/23/14	20:44
39A-21ST-MW0025S-014.5-20141214	J1409737-014	I:\MS52\DATA\MS52-141223\1223-021.D	12/23/14	21:12
39A-21ST-MW0026S-017.5-20141214	J1409737-015	I:\MS52\DATA\MS52-141223\1223-022.D	12/23/14	21:39
39A-21ST-MW0028I-024.5-20141214	J1409737-016	I:\MS52\DATA\MS52-141223\1223-023.D	12/23/14	22:06
39A-DBA-IW0003S-012.0-20141215	J1409737-017	I:\MS52\DATA\MS52-141223\1223-024.D	12/23/14	22:33
39A-DBA-IW0003I-035.5-20141215	J1409737-018	I:\MS52\DATA\MS52-141223\1223-025.D	12/23/14	23:00

QA/QC Report

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Extracted: 12/23/2014
Date Analyzed: 12/23/2014
Time Analyzed: 12:57

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Sample Name: Lab Control Sample
Lab Code: JWG1500320-1

Extraction Method: EPA 5030B
Analysis Method: 8260B

Instrument ID: ms52
File ID: I:\MS52\DATA\MS52-141223\1223-003.D

Level: Low
Extraction Lot: JWG1500320

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	JWG1500320-3	I:\MS52\DATA\MS52-141223\1223-007.D	12/23/14	14:50
39A-21ST-TB-121214	J1409737-010	I:\MS52\DATA\MS52-141223\1223-008.D	12/23/14	15:17
39A-21ST-MW00119S-017.5-20141213	J1409737-001	I:\MS52\DATA\MS52-141223\1223-009.D	12/23/14	15:45
39A-21ST-MW0021S-017.5-20141213	J1409737-002	I:\MS52\DATA\MS52-141223\1223-010.D	12/23/14	16:12
39A-21ST-MW0018S-015.5-20141213	J1409737-003	I:\MS52\DATA\MS52-141223\1223-011.D	12/23/14	16:39
39A-21ST-MW0017S-016.5-20141213	J1409737-004	I:\MS52\DATA\MS52-141223\1223-012.D	12/23/14	17:06
39A-21ST-MW0017I-032.5-20141213	J1409737-005	I:\MS52\DATA\MS52-141223\1223-013.D	12/23/14	17:33
39A-21ST-MW0031I-025.5-20141213	J1409737-006	I:\MS52\DATA\MS52-141223\1223-014.D	12/23/14	18:01
39A-21ST-MW0032I-025.5-20141213	J1409737-007	I:\MS52\DATA\MS52-141223\1223-015.D	12/23/14	18:28
39A-21ST-MW0023S-017.5-20141213	J1409737-008	I:\MS52\DATA\MS52-141223\1223-016.D	12/23/14	18:55
39A-21ST-MW0023I-032.5-20141213	J1409737-009	I:\MS52\DATA\MS52-141223\1223-017.D	12/23/14	19:22
39A-21ST-MW0014I-024.5-20141214	J1409737-011	I:\MS52\DATA\MS52-141223\1223-018.D	12/23/14	19:49
39A-21ST-MW0015I-038.5-20141214	J1409737-012	I:\MS52\DATA\MS52-141223\1223-019.D	12/23/14	20:17
39A-21ST-MW0030I-02.5-20141214	J1409737-013	I:\MS52\DATA\MS52-141223\1223-020.D	12/23/14	20:44
39A-21ST-MW0025S-014.5-20141214	J1409737-014	I:\MS52\DATA\MS52-141223\1223-021.D	12/23/14	21:12
39A-21ST-MW0026S-017.5-20141214	J1409737-015	I:\MS52\DATA\MS52-141223\1223-022.D	12/23/14	21:39
39A-21ST-MW0028I-024.5-20141214	J1409737-016	I:\MS52\DATA\MS52-141223\1223-023.D	12/23/14	22:06
39A-DBA-IW0003S-012.0-20141215	J1409737-017	I:\MS52\DATA\MS52-141223\1223-024.D	12/23/14	22:33
39A-DBA-IW0003I-035.5-20141215	J1409737-018	I:\MS52\DATA\MS52-141223\1223-025.D	12/23/14	23:00

Organic Analysis:
Volatile Organic Compounds by GC/MS

Validation Package

Raw Data

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW00119S-017.5-20141213
Lab Code: J1409737-001

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	7.3		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW00119S-017.5-20141213
Lab Code: J1409737-001

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.28**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**7.6**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	105	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	97	86-113	12/23/14	Acceptable
Dibromofluoromethane	102	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-009.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 15:45	**Quant Date:**	12/26/2014 08:29	**Vial:**	9
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-001			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/13/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281337	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1141576	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	564007	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	408349	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	258750	50.99	102	86-112	OK	
1	1,2-Dichloroethane-d4	7.63	0.00	0.00	65	347495	52.59	105	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1232486	53.54	107	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	419632	48.31	97	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride	2.53	0.01	0.00	62	79963	7.58	7.6		
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.04	0.01	0.00	43	8638	2.85	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.05		0.00	76	9159	0.3400	3.0	U	
1	trans-1,2-Dichloroethene	5.65	0.01	0.00	61	3738	0.2800	0.28	J	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than lowest pt of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-009.D		**Instrument:** ms52
Acqu Date:	12/23/2014 15:45	**Quant Date:** 12/26/2014 08:29	**Vial:** 9
Run Type:	SMPL		**Dilution:** 1.0
Lab ID:	J1409737-001		**Soln Conc. Units:** ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.71		0.00	61	98275	7.25	7.3		
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

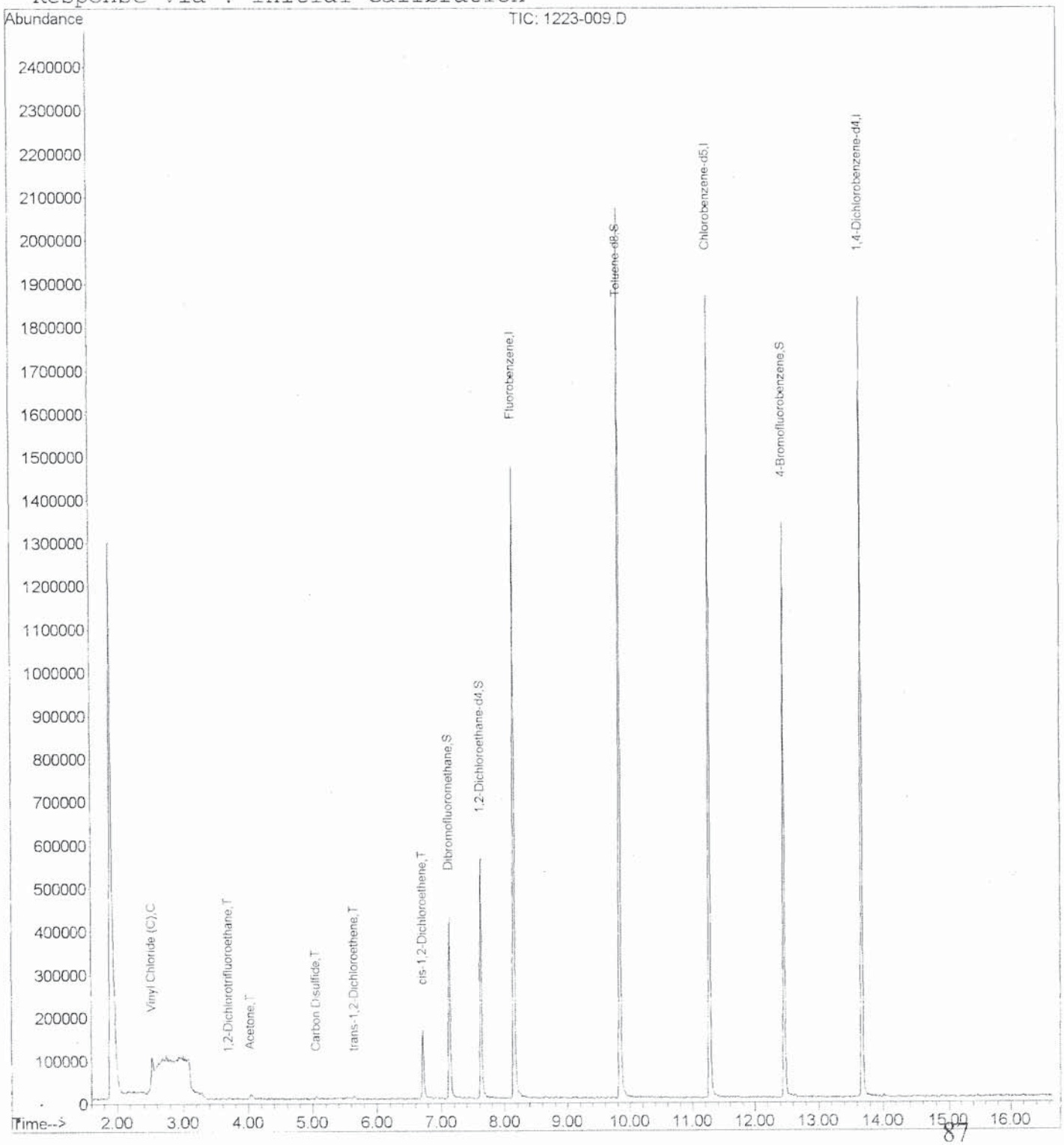
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-009.D Vial: 9
Acq On : 23 Dec 2014 3:45 pm Operator: SGA
Sample : J1409737-001 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:29 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0021S-017.5-20141213
Lab Code: J1409737-002

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	29		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

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Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0021S-017.5-20141213
Lab Code: J1409737-002

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.19**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**0.88**	I	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	105	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	101	86-113	12/23/14	Acceptable
Dibromofluoromethane	101	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-010.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 16:12	**Quant Date:**	12/26/2014 08:30	**Vial:**	10
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-002			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/13/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281338	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1086442	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	540787	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	384161	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	242651	50.25	101	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	331536	52.72	105	72-121	OK	
2	Toluene-d8	9.83	-0.01	0.00	98	1183585	53.62	107	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	411564	50.36	101	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride	2.54	0.02	0.00	62	8867	0.8800	0.88	J	
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.03		0.00	43	7041	2.44	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.06	0.01	0.00	76	7612	0.2900	3.0	U	
1	trans-1,2-Dichloroethene	5.66	0.02	0.00	61	2478	0.1900	0.19	J	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-010.D		**Instrument:** ms52
Acqu Date:	12/23/2014 16:12	**Quant Date:** 12/26/2014 08:30	**Vial:** 10
Run Type:	SMPL		**Dilution:** 1.0
Lab ID:	J1409737-002		**Soln Conc. Units:** ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.72	0.01	0.00	61	379388	29.42	29		
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0d		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

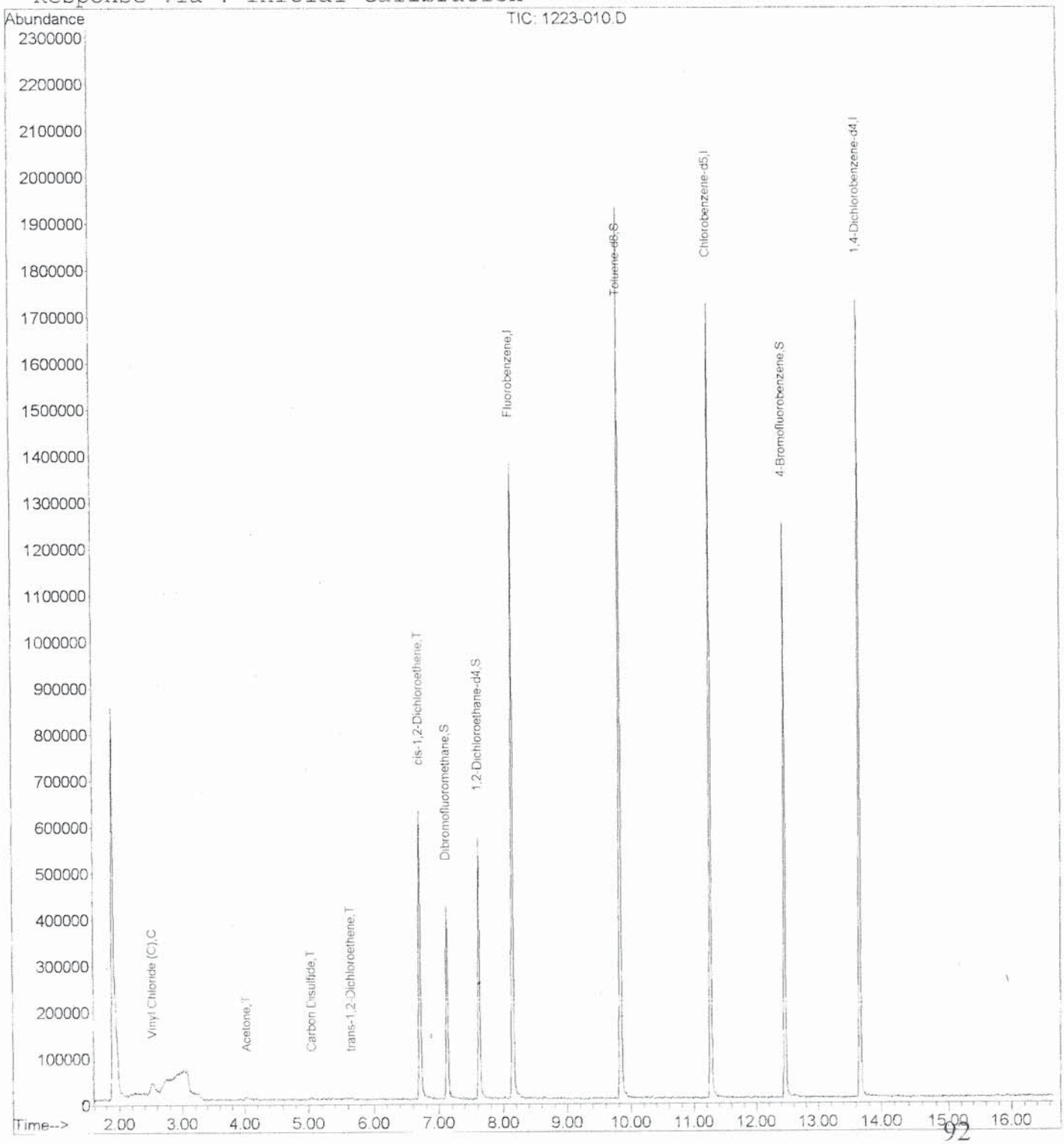
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-010.D Vial: 10
Acq On : 23 Dec 2014 4:12 pm Operator: SGA
Sample : J1409737-002 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:30 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0018S-015.5-20141213
Lab Code: J1409737-003

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	22		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0018S-015.5-20141213
Lab Code: J1409737-003

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	**37**	J	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	**16**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	**32**		20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	**3900**	L	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**2.7**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	104	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	99	86-113	12/23/14	Acceptable
Dibromofluoromethane	106	86-112	12/23/14	Acceptable
Toluene-d8	109	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-011.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 16:39	**Quant Date:**	12/26/2014 08:34	**Vial:**	11
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-003			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/13/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281339	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1072269	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	516899	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	381036	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	252690	53.02	106	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	321740	51.84	104	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1153240	54.66	109	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	401662	49.55	99	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane	2.09	-0.05	-0.01	85	364807	37.18	37		
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride	2.53	0.01	0.00	62	26883	2.71	2.7		
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane	3.71	0.01	0.00	101	344724	31.60	32		
1	Acetone				43	0d		5.6	U	
1	1,1-Dichloroethene				61	0d		0.16	U	
1	Methylene Chloride				84	0d		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane	4.58	-0.01	0.00	101	26726800m	3,892	3900	E	
1	Carbon Disulfide				76	0d		3.0	U	
1	trans-1,2-Dichloroethene				61	0d		0.12	U	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-011.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 16:39	**Quant Date:**	12/26/2014 08:34	**Vial:**	11
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-003			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.71		0.00	61	283009	22.24	22		
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)	8.64		0.00	130	116509	15.75	16		
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

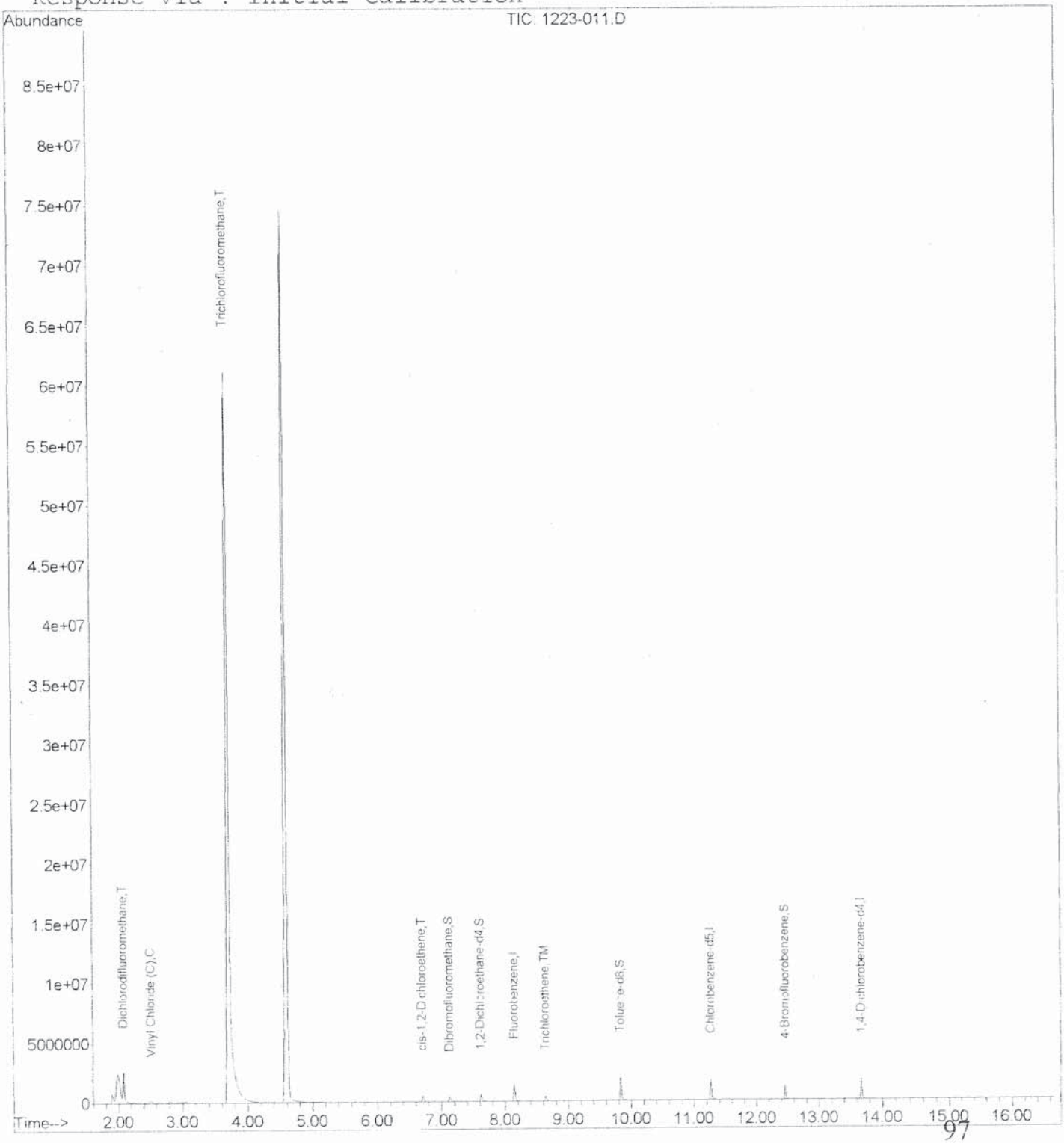
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low limit of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-011.D Vial: 11
Acq On : 23 Dec 2014 4:39 pm Operator: SGA
Sample : J1409737-003 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:33 2014 Quant Results File: 141130W.RES

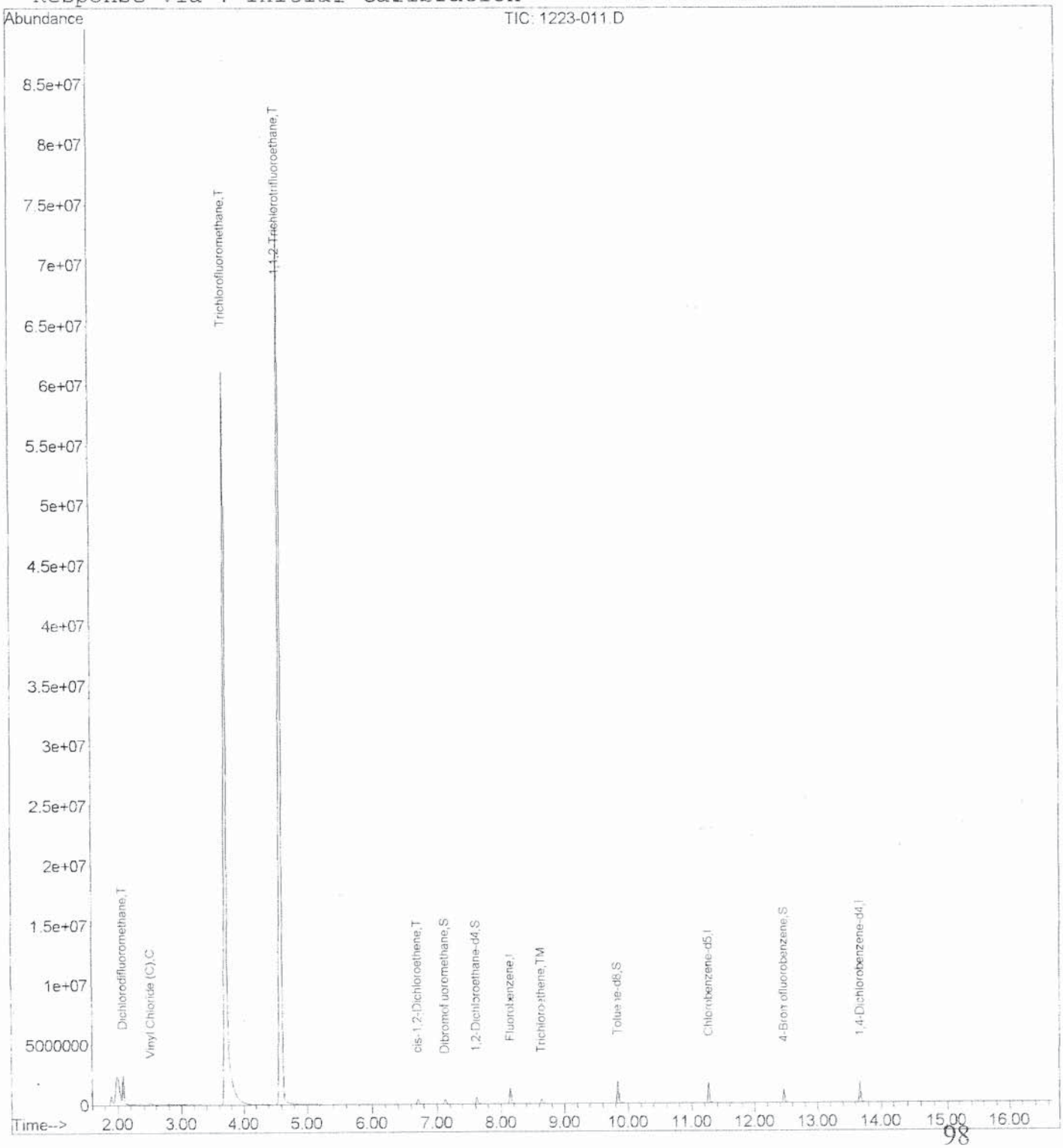
Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-011.D Vial: 11
Acq On : 23 Dec 2014 4:39 pm Operator: SGA
Sample : J1409737-003 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:34 2014 Quant Results File: 141130W.RES

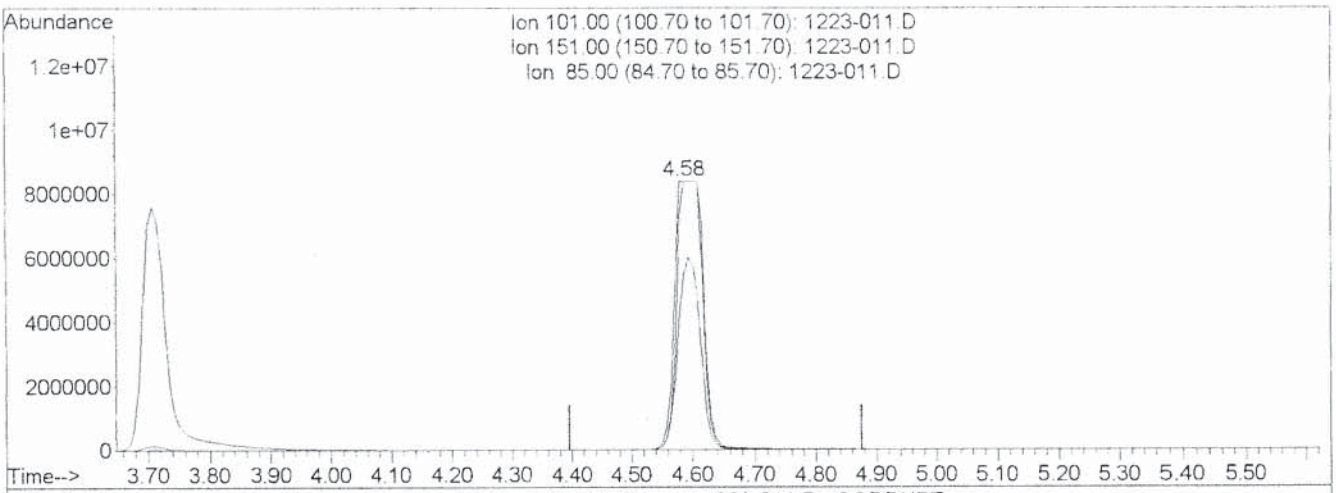
Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration

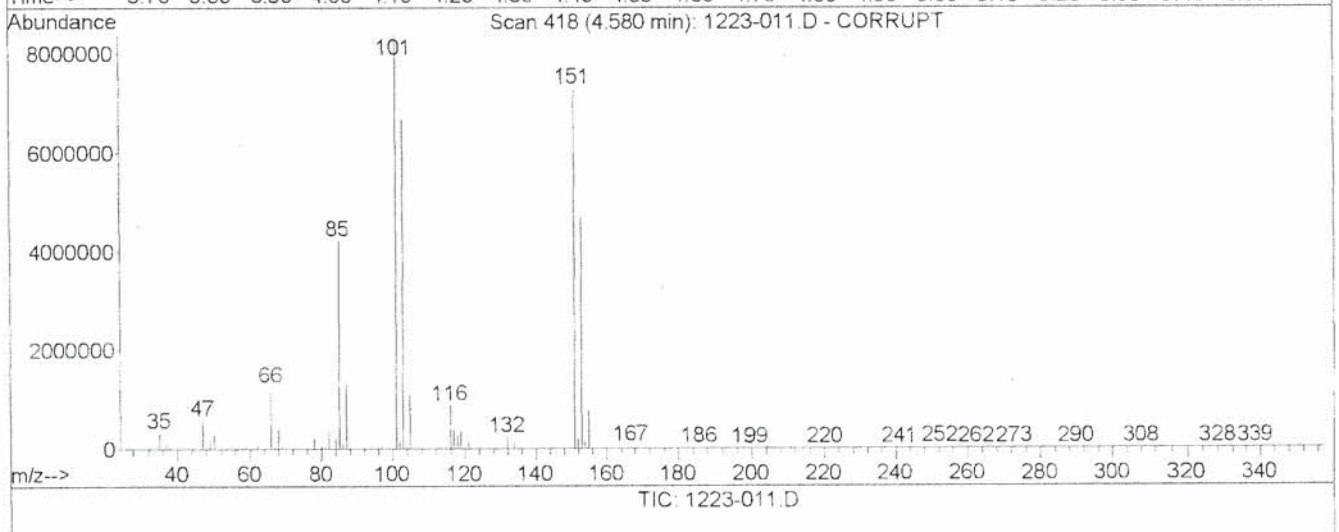


Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141223\1223-011.D Vial: 11
Acq On : 23 Dec 2014 4:39 pm Operator: SGA
Sample : J1409737-003 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:34 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Multiple Level Calibration





TIC: 1223-011.D

(20) 1,1,2-Trichlorotrifluoroethane (T)

4.58min 3891.53ug/L m

response 26726800

Ion	Exp%	Act%
101.00	100	100
151.00	67.10	0.00#
85.00	50.00	0.00#
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER

ANALYST 12/26/14
DATE

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0017S-016.5-20141213
Lab Code: J1409737-004

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	ND	U	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

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Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0017S-016.5-20141213
Lab Code: J1409737-004

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	**0.64**	I	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**1.3**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	105	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	99	86-113	12/23/14	Acceptable
Dibromofluoromethane	106	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-012.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 17:06	**Quant Date:**	12/26/2014 08:35	**Vial:**	12
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-004			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/13/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281340	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1060454	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	528367	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	382566	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	249136	52.85	106	86-112	OK	
1	1,2-Dichloroethane-d4	7.63	0.00	0.00	65	322986	52.62	105	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1157037	53.65	107	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	401825	49.37	99	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride	2.53	0.01	0.00	62	12652	1.29	1.3		
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.04	0.01	0.00	43	9523	3.38	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane	4.59		0.00	101	4337	0.6400	0.64	J	
1	Carbon Disulfide	5.05		0.00	76	13541	0.5300	3.0	U	
1	trans-1,2-Dichloroethene				61	0		0.12	U	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-012.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 17:06	**Quant Date:**	12/26/2014 08:35	**Vial:**	12
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-004			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene				61	0		0.36	U	
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

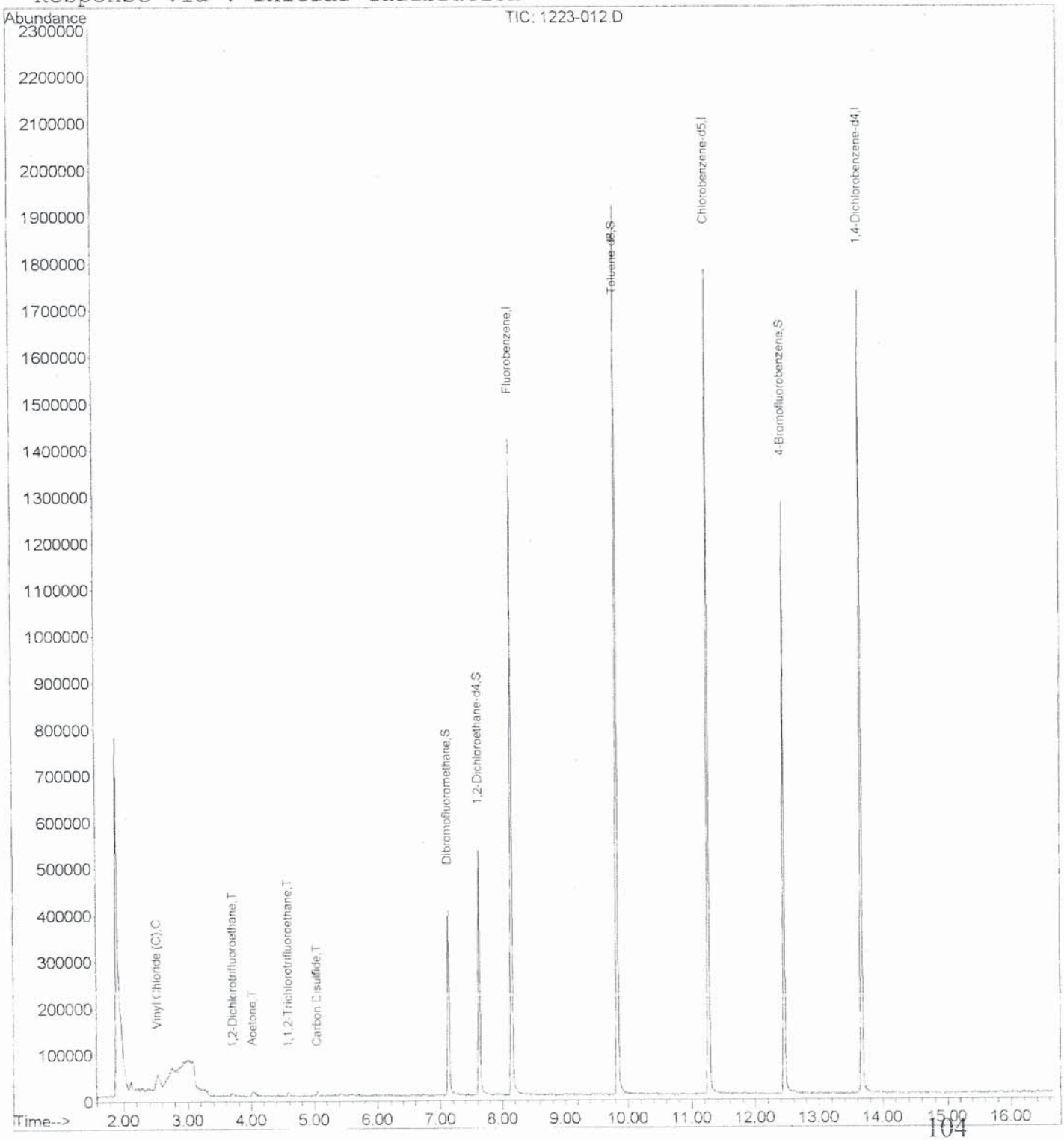
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-012.D Vial: 12
Acq On : 23 Dec 2014 5:06 pm Operator: SGA
Sample : J1409737-004 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:35 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0017I-032.5-20141213
Lab Code: J1409737-005

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	**0.98**	I	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**0.84**	I	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

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Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0017I-032.5-20141213
Lab Code: J1409737-005

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**1.7**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	106	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	97	86-113	12/23/14	Acceptable
Dibromofluoromethane	102	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

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Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-013.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 17:33	**Quant Date:**	12/26/2014 08:36	**Vial:**	13
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-005			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/13/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281341	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1027652	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	507626	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	374875	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	233601	51.14	102	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	314344	52.85	106	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1110071	53.58	107	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	387095	48.54	97	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0		0.11	U	
1	Vinyl Chloride				62	0d		0.22	U	
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.03		0.00	43	6932	2.54	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.05		0.00	76	10905	0.4400	3.0	U	
1	trans-1,2-Dichloroethene	5.65	0.01	0.00	61	20780	1.70	1.7		
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-013.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 17:33	**Quant Date:**	12/26/2014 08:36	**Vial:**	13
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-005			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane	6.01	-0.01	0.00	63	15552	0.9800	0.98	J	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.72	0.01	0.00	61	10240	0.8400	0.84	J	
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0d		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (E				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

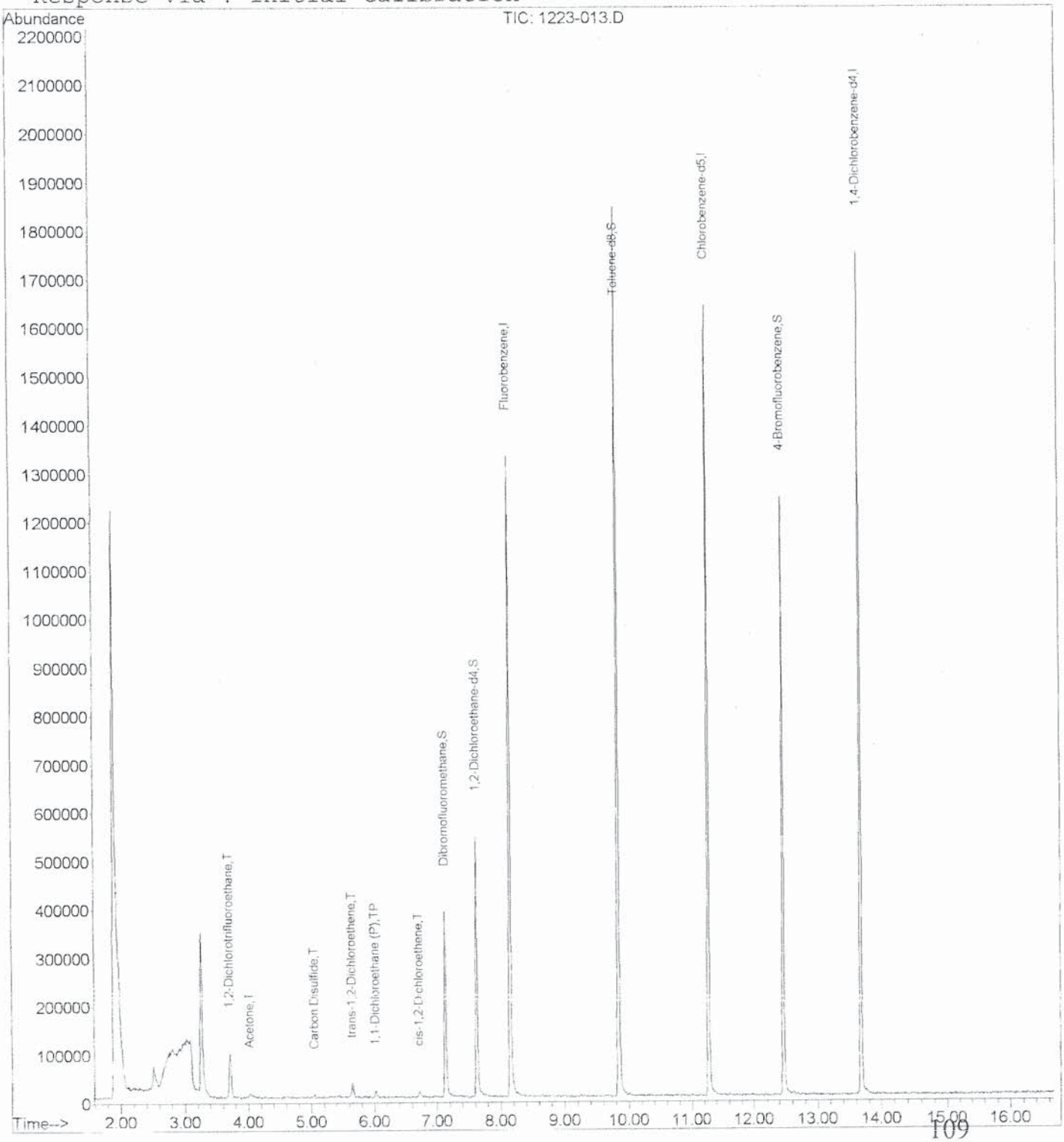
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-013.D Vial: 13
Acq On : 23 Dec 2014 5:33 pm Operator: SGA
Sample : J1409737-005 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:36 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Tetra Tech NUS, Inc.	**Service Request:**	J1409737
Project:	LC39/112G06925	**Date Collected:**	12/13/2014
Sample Matrix:	Water	**Date Received:**	12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name:	39A-21ST-MW0031I-025.5-20141213	**Units:**	ug/L
Lab Code:	J1409737-006	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**0.51**	I	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

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Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0031I-025.5-20141213
Lab Code: J1409737-006

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.86**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**1.7**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	107	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	98	86-113	12/23/14	Acceptable
Dibromofluoromethane	98	86-112	12/23/14	Acceptable
Toluene-d8	108	88-115	12/23/14	Acceptable

Comments:

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Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-014.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 18:01	**Quant Date:**	12/26/2014 08:37	**Vial:**	14
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-006			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/13/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281342	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1039669	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	501750	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	369856	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	226459	49.00	98	86-112	OK	
1	1,2-Dichloroethane-d4	7.63	0.00	0.00	65	321257	53.39	107	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1107091	54.06	108	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	385257	48.96	98	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride	2.53	0.01	0.00	62	15933	1.66	1.7		
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone				43	0d		5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.06	0.01	0.00	76	16525	0.6600	3.0	U	
1	trans-1,2-Dichloroethene	5.65	0.01	0.00	61	10677	0.8600	0.86	J	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-014.D		
Acqu Date:	12/23/2014 18:01	**Quant Date:**	12/26/2014 08:37
Run Type:	SMPL		
Lab ID:	J1409737-006		

Instrument:	ms52
Vial:	14
Dilution:	1.0
Soln Conc. Units:	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.72	0.01	0.00	61	6293	0.5100	0.51	J	
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

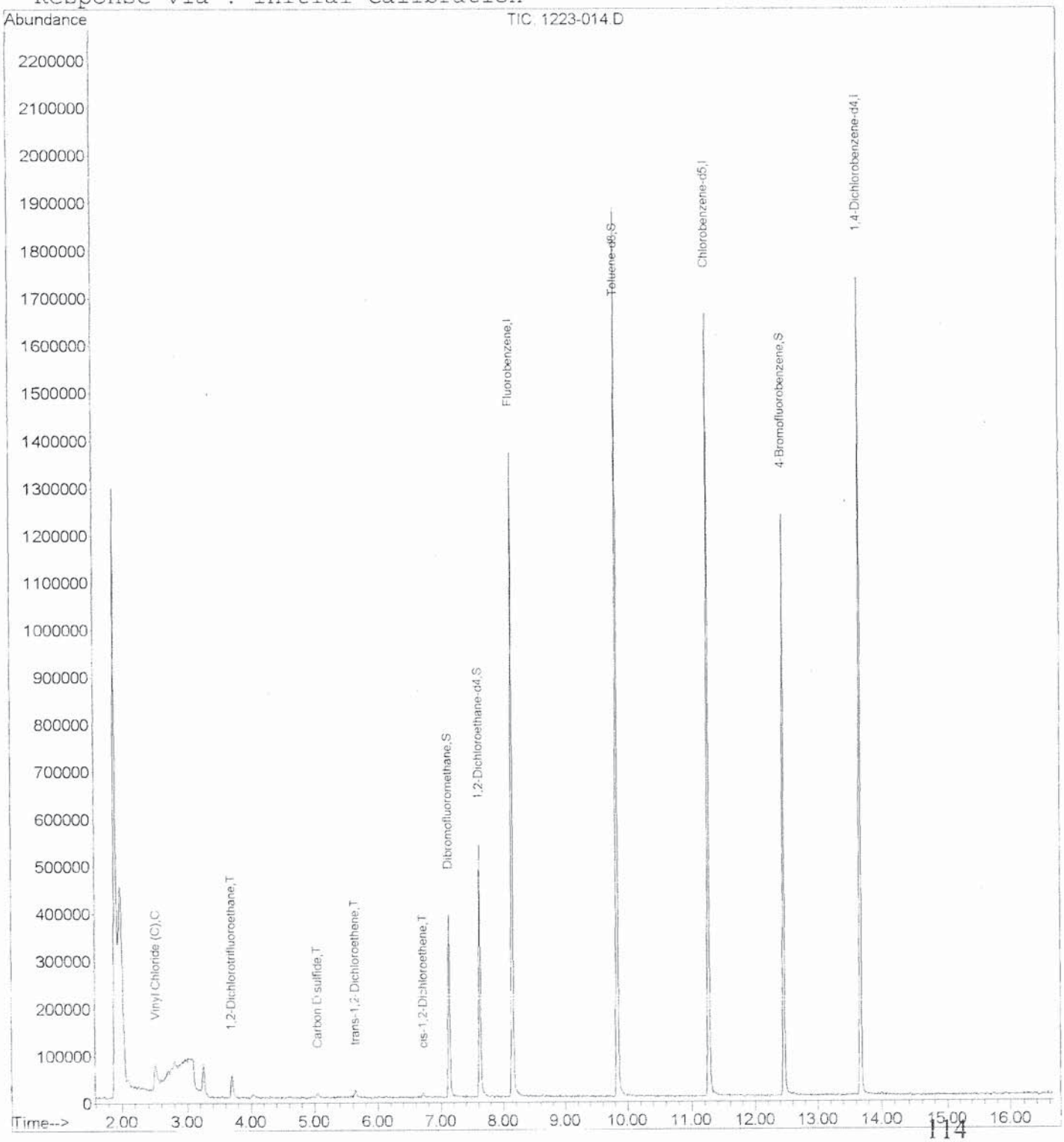
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-014.D Vial: 14
Acq On : 23 Dec 2014 6:01 pm Operator: SGA
Sample : J1409737-006 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:37 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0032I-025.5-20141213
Lab Code: J1409737-007

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	**0.44**	I	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**1.7**		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

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Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0032I-025.5-20141213
Lab Code: J1409737-007

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**1.5**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	**4.7**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**7.3**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	110	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	99	86-113	12/23/14	Acceptable
Dibromofluoromethane	102	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-015.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 18:28	**Quant Date:**	12/26/2014 08:39	**Vial:**	15
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-007			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/13/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
		Prep Date:	12/23/2014		
Prep Ref:	281343				

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1010178	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	502617	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	367551	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	229910	51.20	102	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	321284	54.95	110	72-121	OK	
2	Toluene-d8	9.83	-0.01	0.00	98	1098505	53.55	107	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	385981	49.36	99	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride	2.53	0.01	0.00	62	68350	7.32	7.3		
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.04	0.01	0.00	43	4518	1.69	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride	5.00	0.01	0.00	84	1085	0.1300	0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.06	0.01	0.00	76	8146	0.3400	3.0	U	
1	trans-1,2-Dichloroethene	5.65	0.01	0.00	61	17417	1.45	1.5		
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-015.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 18:28	**Quant Date:**	12/26/2014 08:39	**Vial:**	15
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-007			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane	6.01	-0.01	0.00	63	6807	0.4400	0.44	J	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.71		0.00	61	20626	1.72	1.7		
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)	8.65	0.01	0.00	130	5195	4.71	4.7		
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0d		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

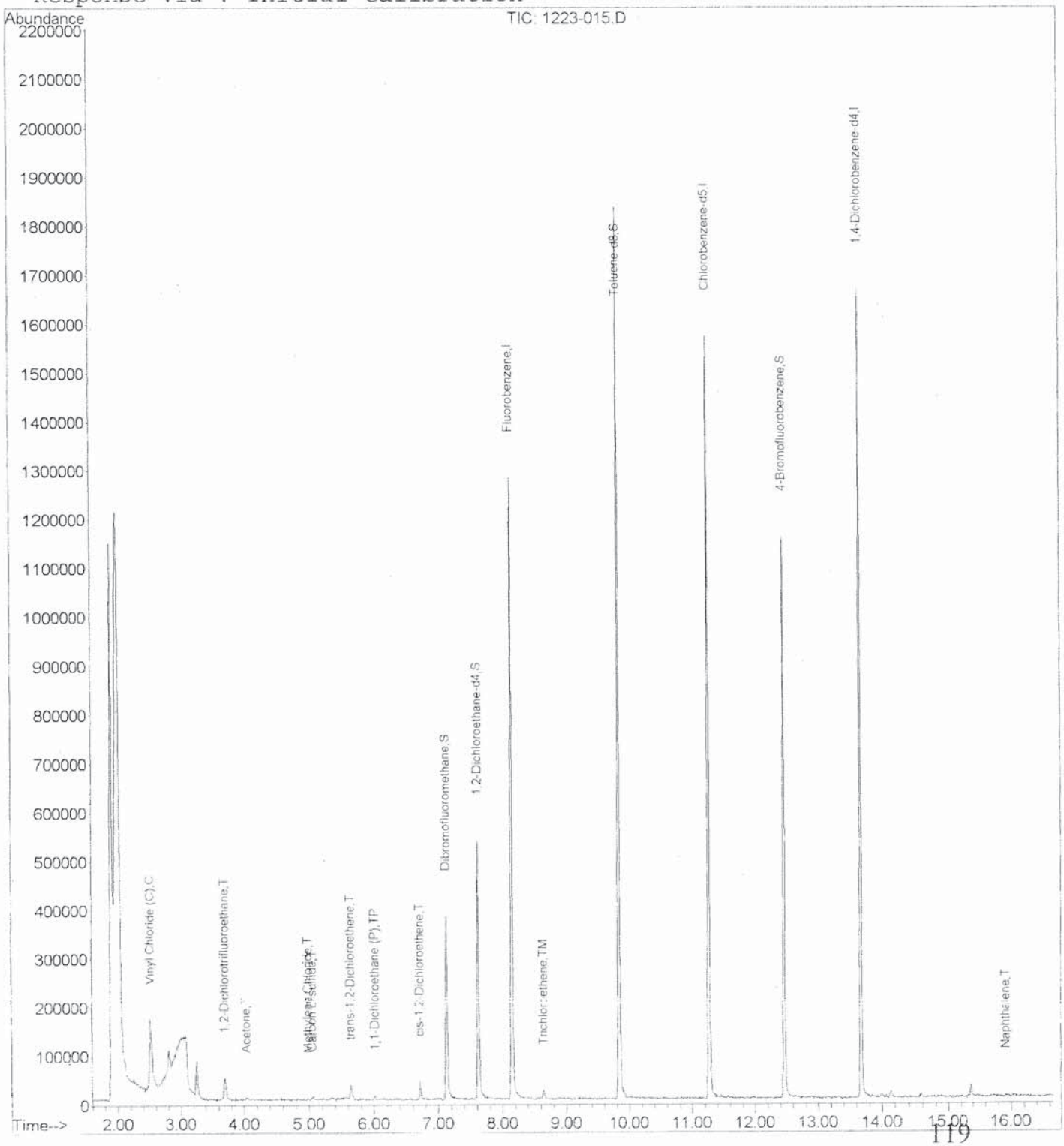
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-015.D Vial: 15
Acq On : 23 Dec 2014 6:28 pm Operator: SGA
Sample : J1409737-007 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:39 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0023S-017.5-20141213
Lab Code: J1409737-008

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**4.7**		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

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Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0023S-017.5-20141213
Lab Code: J1409737-008

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	**0.23**	I	20	0.23	1	12/23/14	12/23/14	JWG1500320	
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	**5.1**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**2.9**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	106	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	96	86-113	12/23/14	Acceptable
Dibromofluoromethane	105	86-112	12/23/14	Acceptable
Toluene-d8	110	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-016.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 18:55	**Quant Date:**	12/26/2014 08:40	**Vial:**	16
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-008			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/13/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281344	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	996272	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	488009	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	368915	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	231628	52.30	105	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	306058	53.08	106	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1096700	55.06	110	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	375264	47.82	96	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane	2.09	-0.05	-0.01	85	2094	0.2300	0.23	J	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride	2.52		0.00	62	26471	2.87	2.9		
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.05	0.02	0.00	43	6375	2.41	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.05		0.00	76	8385	0.3500	3.0	U	
1	trans-1,2-Dichloroethene				61	0d		0.12	U	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-016.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 18:55	**Quant Date:**	12/26/2014 08:40	**Vial:**	16
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-008			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.72	0.01	0.00	61	55244	4.67	4.7		
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)	8.65	0.01	0.00	130	8940	5.11	5.1		
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

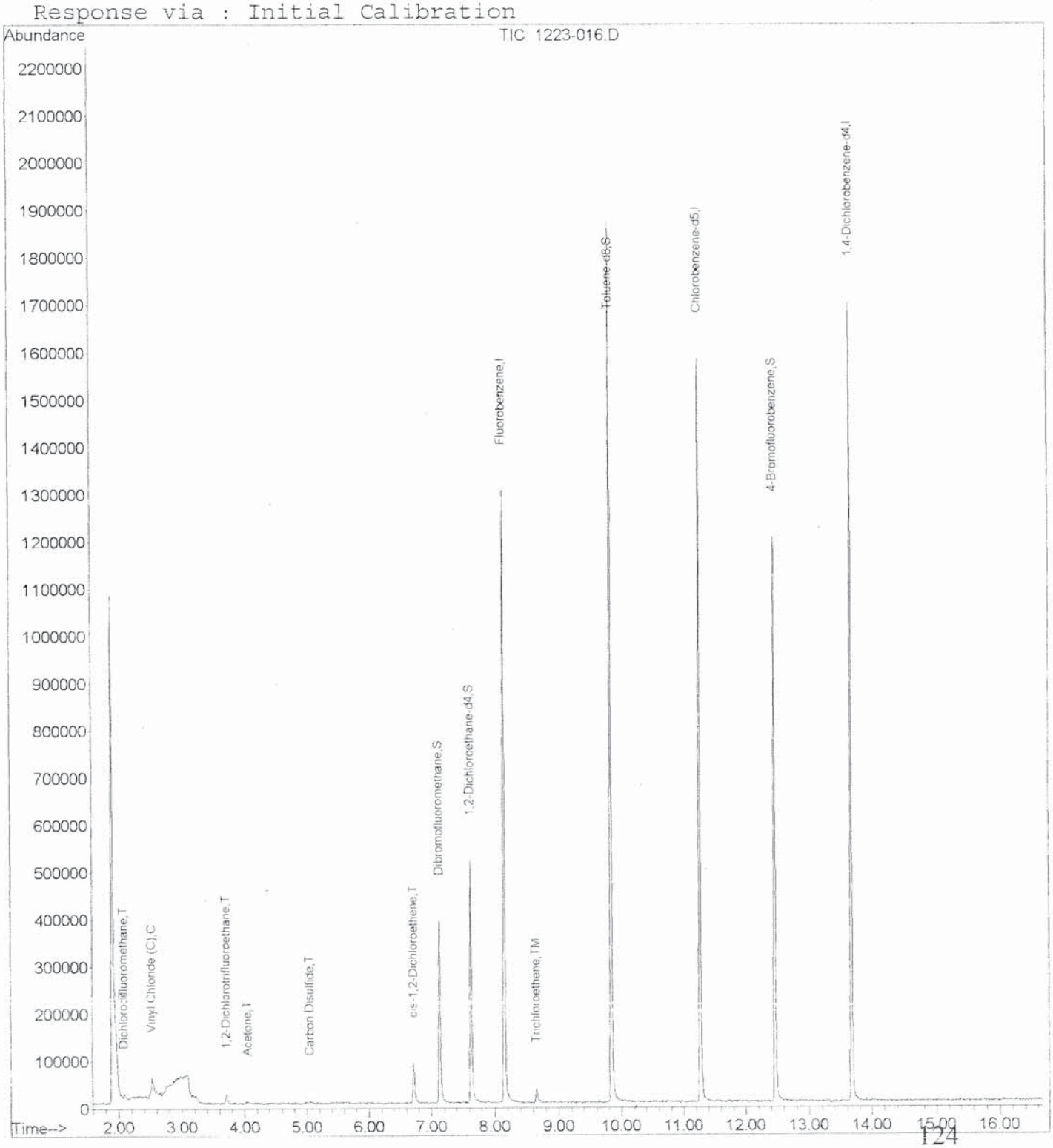
U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File : I:\MS52\DATA\MS52-141223\1223-016.D Vial: 16
Acq On : 23 Dec 2014 6:55 pm Operator: SGA
Sample : J1409737-008 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:40 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0023I-032.5-20141213
Lab Code: J1409737-009

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	**0.22**	I	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**0.46**	I	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0023I-032.5-20141213
Lab Code: J1409737-009

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.80**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	110	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	100	86-113	12/23/14	Acceptable
Dibromofluoromethane	103	86-112	12/23/14	Acceptable
Toluene-d8	108	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-017.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 19:22	**Quant Date:**	12/26/2014 08:41	**Vial:**	17
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-009			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/13/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281345	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1006483	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	496593	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	360195	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	229921	51.39	103	86-112	OK	
1	1,2-Dichloroethane-d4	7.63	0.00	0.00	65	319228	54.80	110	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1089461	53.75	108	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	382019	49.85	100	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride				62	0		0.22	U	
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.04	0.01	0.00	43	6922	2.59	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.05		0.00	76	8823	0.3700	3.0	U	
1	trans-1,2-Dichloroethene	5.65	0.01	0.00	61	9604	0.8000	0.80	J	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-017.D		**Instrument:** ms52
Acqu Date:	12/23/2014 19:22	**Quant Date:** 12/26/2014 08:41	**Vial:** 17
Run Type:	SMPL		**Dilution:** 1.0
Lab ID:	J1409737-009		**Soln Conc. Units:** ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Fiual Conc	Q	Rpt?
1	1,1-Dichloroethane	6.01	-0.01	0.00	63	3447	0.2200	0.22	J	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.72	0.01	0.00	61	5552	0.4600	0.46	J	
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (E				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

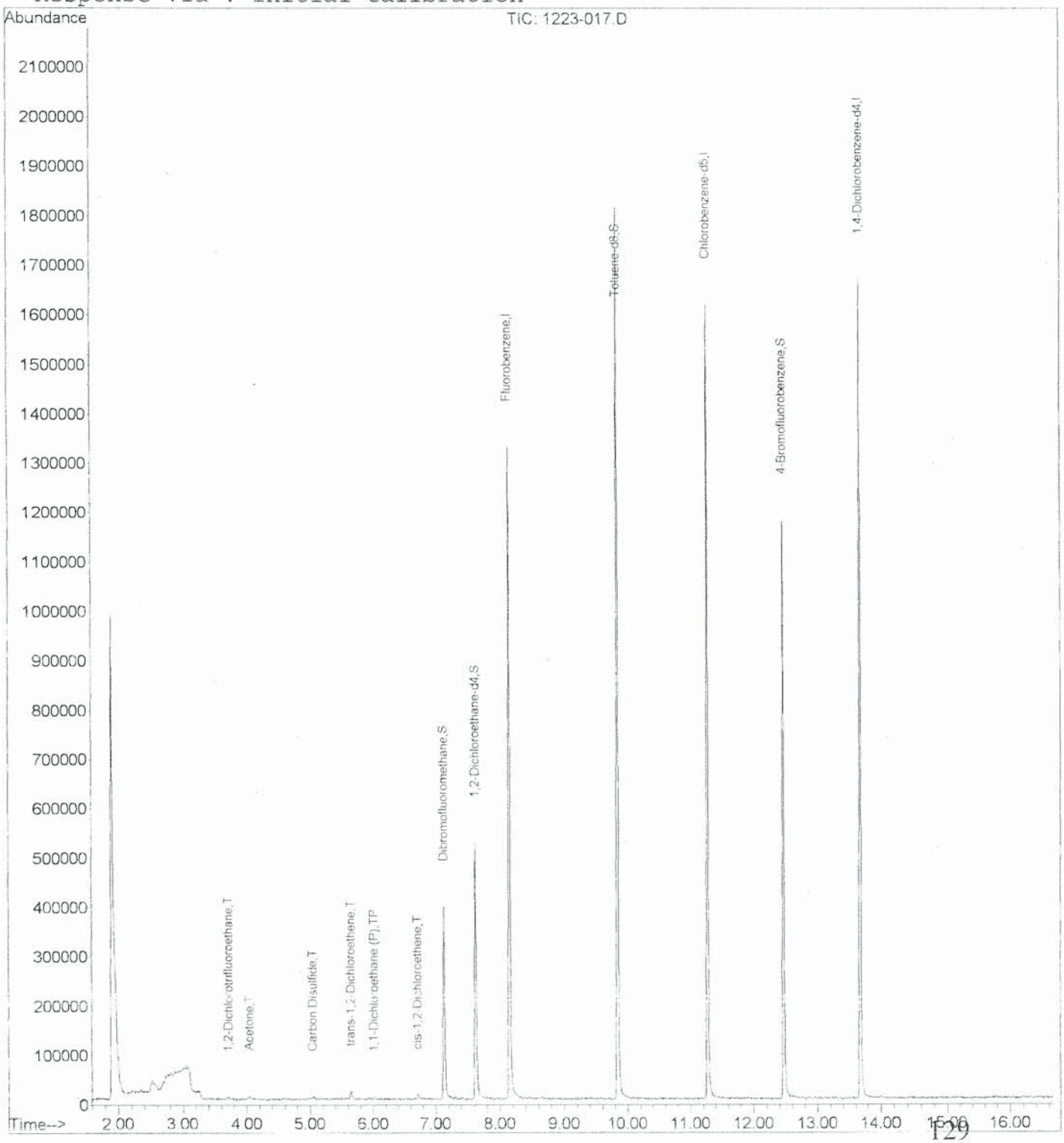
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-017.D Vial: 17
Acq On : 23 Dec 2014 7:22 pm Operator: SGA
Sample : J1409737-009 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:41 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-TB-121214
Lab Code: J1409737-010

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	**4.2**	V	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	ND	U	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/13/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-TB-121214
Lab Code: J1409737-010

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	102	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	100	86-113	12/23/14	Acceptable
Dibromofluoromethane	102	86-112	12/23/14	Acceptable
Toluene-d8	110	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-008.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 15:17	**Quant Date:**	12/26/2014 08:28	**Vial:**	8
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-010			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/13/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281346	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1192926	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	574952	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	422680	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	269491	50.82	102	86-112	OK	
1	1,2-Dichloroethane-d4	7.63	0.00	0.00	65	351254	50.87	102	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1290828	55.00	110	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	451316	50.19	100	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride				62	0		0.22	U	
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.03		0.00	43	2859	0.9000	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride	4.98	-0.01	0.00	84	1936	0.1900	0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.06	0.01	0.00	76	3451	0.1200	3.0	U	
1	trans-1,2-Dichloroethene				61	0		0.12	U	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-008.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 15:17	**Quant Date:**	12/26/2014 08:28	**Vial:**	8
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-010			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene				61	0		0.36	U	
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene	13.69	-0.01	0.00	146	1548	4.23	4.2	B	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0d		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

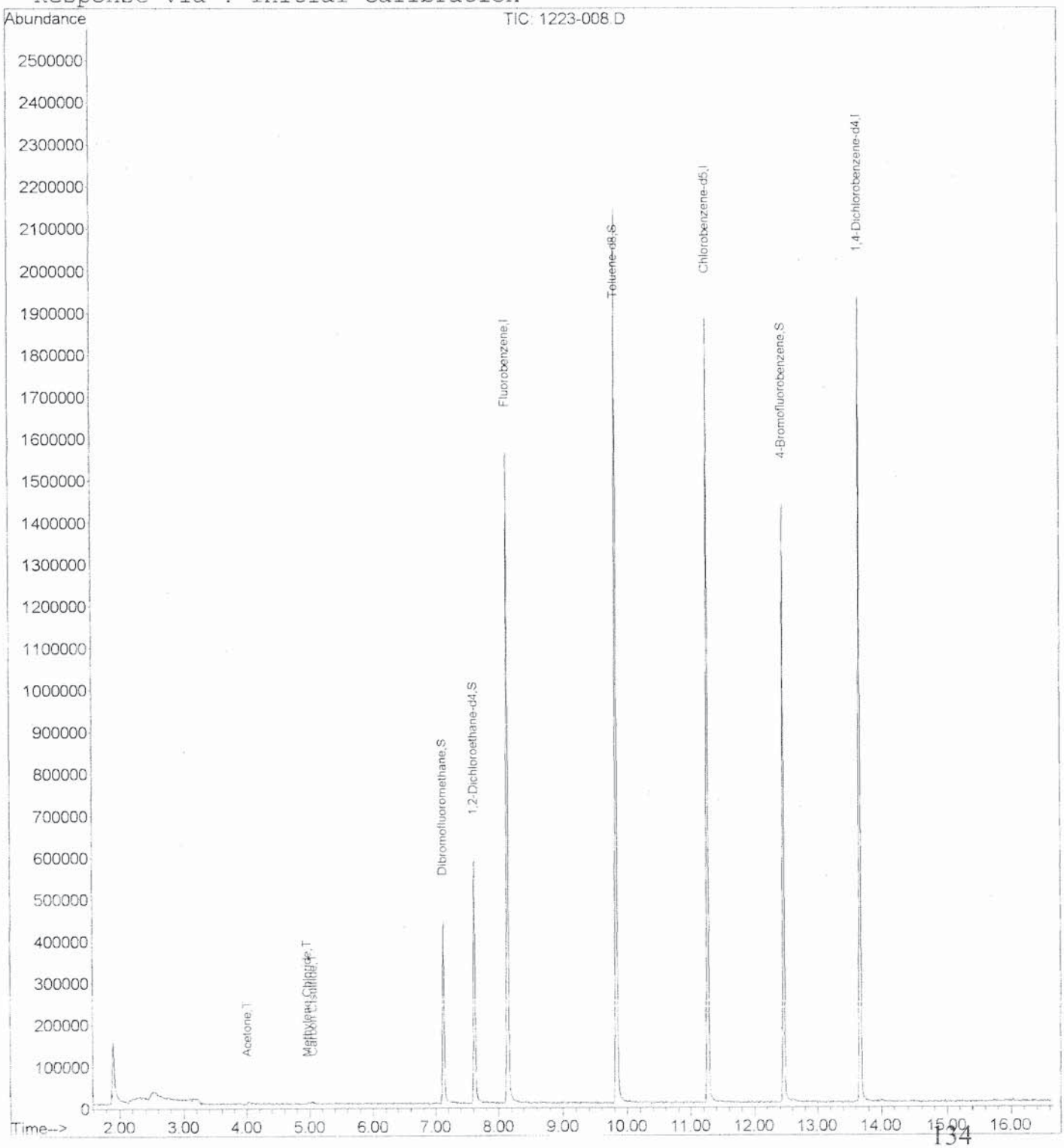
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-008.D Vial: 8
Acq On : 23 Dec 2014 3:17 pm Operator: SGA
Sample : J1409737-010 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 29 9:15 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW00141-024.5-20141214
Lab Code: J1409737-011

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	1.1		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0014I-024.5-20141214
Lab Code: J1409737-011

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**3.2**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**3.7**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	102	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	97	86-113	12/23/14	Acceptable
Dibromofluoromethane	99	86-112	12/23/14	Acceptable
Toluene-d8	108	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-018.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 19:49	**Quant Date:**	12/26/2014 08:43	**Vial:**	18
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-011			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/14/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281347	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1062469	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	516867	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	367631	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	234044	49.56	99	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	313987	51.06	102	72-121	OK	
2	Toluene-d8	9.83	-0.01	0.00	98	1134254	53.76	108	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	380510	48.65	97	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride	2.53	0.01	0.00	62	36205	3.69	3.7		
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone				43	0d		5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide				76	0d		3.0	U	
1	trans-1,2-Dichloroethene	5.65	0.01	0.00	61	40492	3.21	3.2		
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-018.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 19:49	**Quant Date:**	12/26/2014 08:43	**Vial:**	18
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-011			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.72	0.01	0.00	61	14366	1.14	1.1		
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (E				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

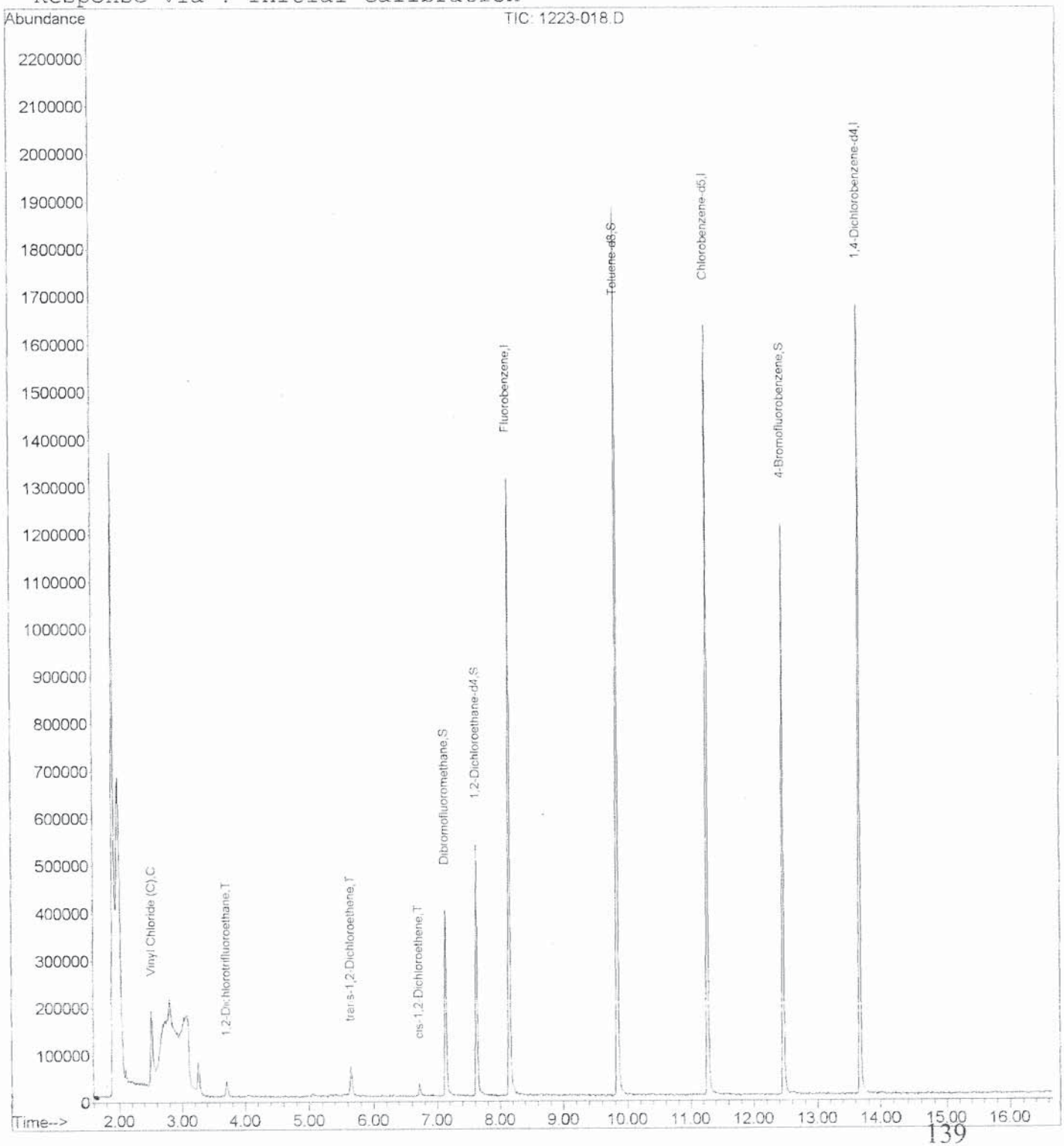
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-018.D Vial: 18
Acq On : 23 Dec 2014 7:49 pm Operator: SGA
Sample : J1409737-011 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:43 2014 Quant Results File: 141130W.RES

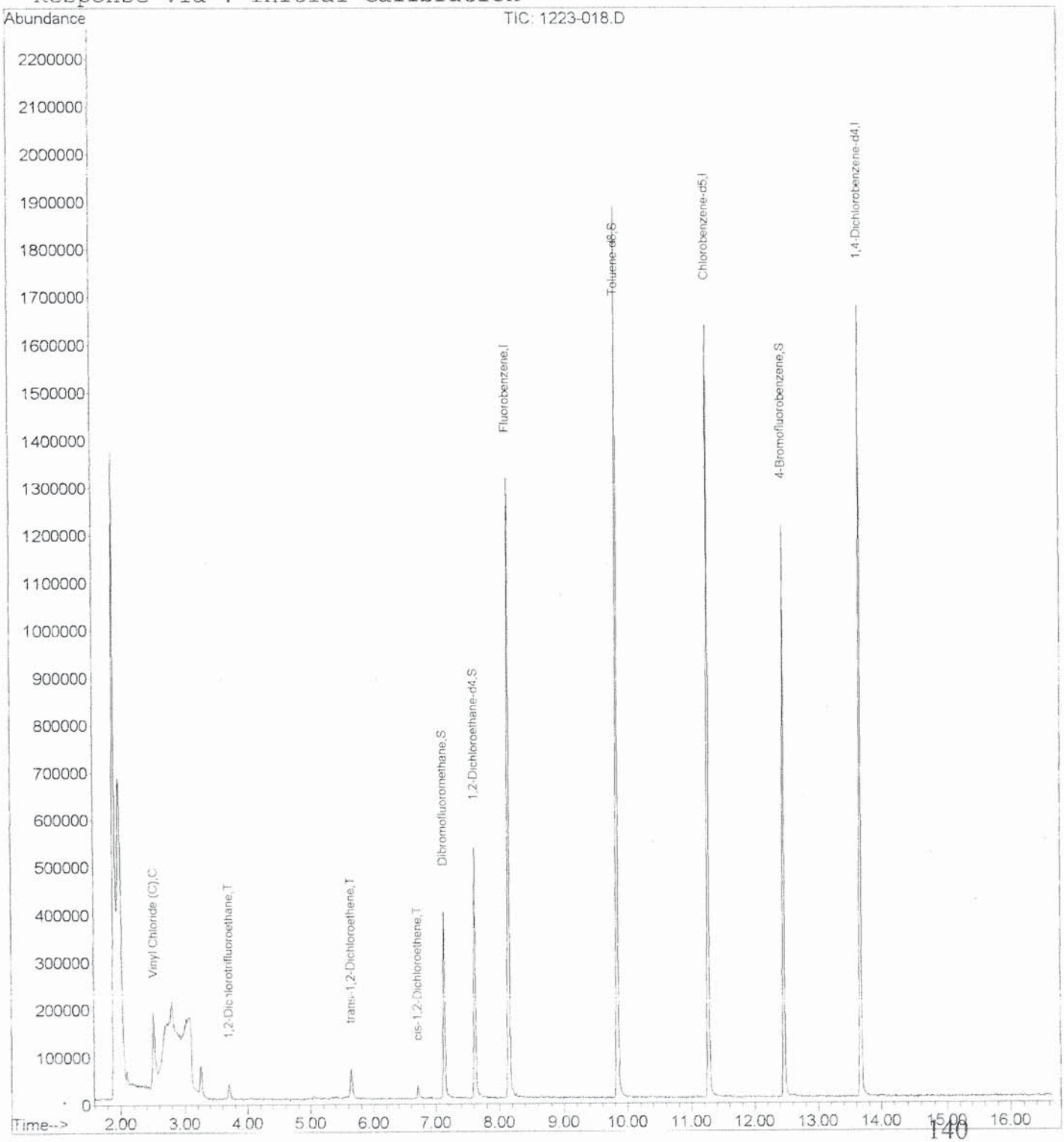
Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-018.D Vial: 18
Acq On : 23 Dec 2014 7:49 pm Operator: SGA
Sample : J1409737-011 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:43 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0015I-038.5-20141214
Lab Code: J1409737-012

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	**4.2**	V	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**1.2**		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0015I-038.5-20141214
Lab Code: J1409737-012

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**1.7**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**1.7**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	111	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	100	86-113	12/23/14	Acceptable
Dibromofluoromethane	104	86-112	12/23/14	Acceptable
Toluene-d8	109	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-019.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 20:17	**Quant Date:**	12/26/2014 08:44	**Vial:**	19
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-012			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/14/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281348	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	979594	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	488752	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	349257	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	226195	51.95	104	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	314107	55.40	111	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1083841	54.33	109	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	371842	50.05	100	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride	2.52		0.00	62	15228	1.68	1.7		
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.04	0.01	0.00	43	5789	2.23	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.07	0.02	0.00	76	6597	0.2800	3.0	U	
1	trans-1,2-Dichloroethene	5.65	0.01	0.00	61	19555	1.68	1.7		
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than lowest point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-019.D		
Acqu Date:	12/23/2014 20:17	**Quant Date:**	12/26/2014 08:44
Run Type:	SMPL		
Lab ID:	J1409737-012		
Instrument:	ms52		
Vial:	19		
Dilution:	1.0		
Soln Conc. Units:	ug/L		

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.71		0.00	61	13606	1.17	1.2		
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene	13.69	-0.01	0.00	146	1110	4.22	4.2	B	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

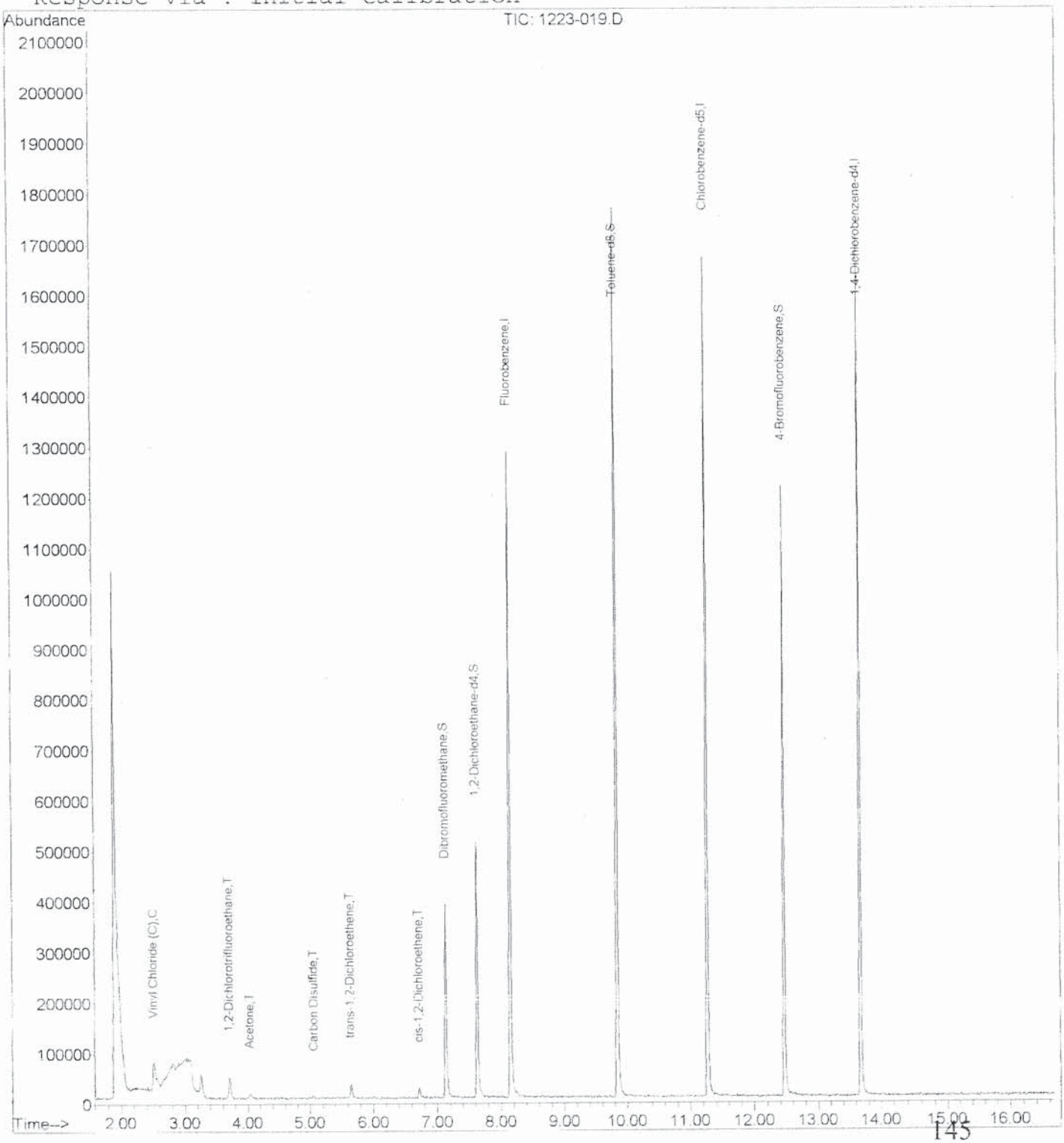
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-019.D Vial: 19
Acq On : 23 Dec 2014 8:17 pm Operator: SGA
Sample : J1409737-012 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 29 9:25 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0030I-02.5-20141214
Lab Code: J1409737-013

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**9.1**		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0030I-02.5-20141214
Lab Code: J1409737-013

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.42**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**6.8**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	106	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	98	86-113	12/23/14	Acceptable
Dibromofluoromethane	106	86-112	12/23/14	Acceptable
Toluene-d8	108	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-020.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 20:44	**Quant Date:**	12/26/2014 08:46	**Vial:**	20
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-013			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/14/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281349	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1001006	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	495792	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	358012	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	235215	52.86	106	86-112	OK	
1	1,2-Dichloroethane-d4	7.63	0.00	0.00	65	307329	53.04	106	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1094040	54.06	108	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	372436	48.90	98	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride	2.53	0.01	0.00	62	62814	6.79	6.8		
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone				43	0d		5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.06	0.01	0.00	76	7542	0.3100	3.0	U	
1	trans-1,2-Dichloroethene	5.66	0.02	0.00	61	4943	0.4200	0.42	J	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-020.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 20:44	**Quant Date:**	12/26/2014 08:46	**Vial:**	20
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-013			**Soln Conc. Units:**	ug/L

Target Compounds **Final Conc. Units:** ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.72	0.01	0.00	61	108083	9.10	9.1		
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

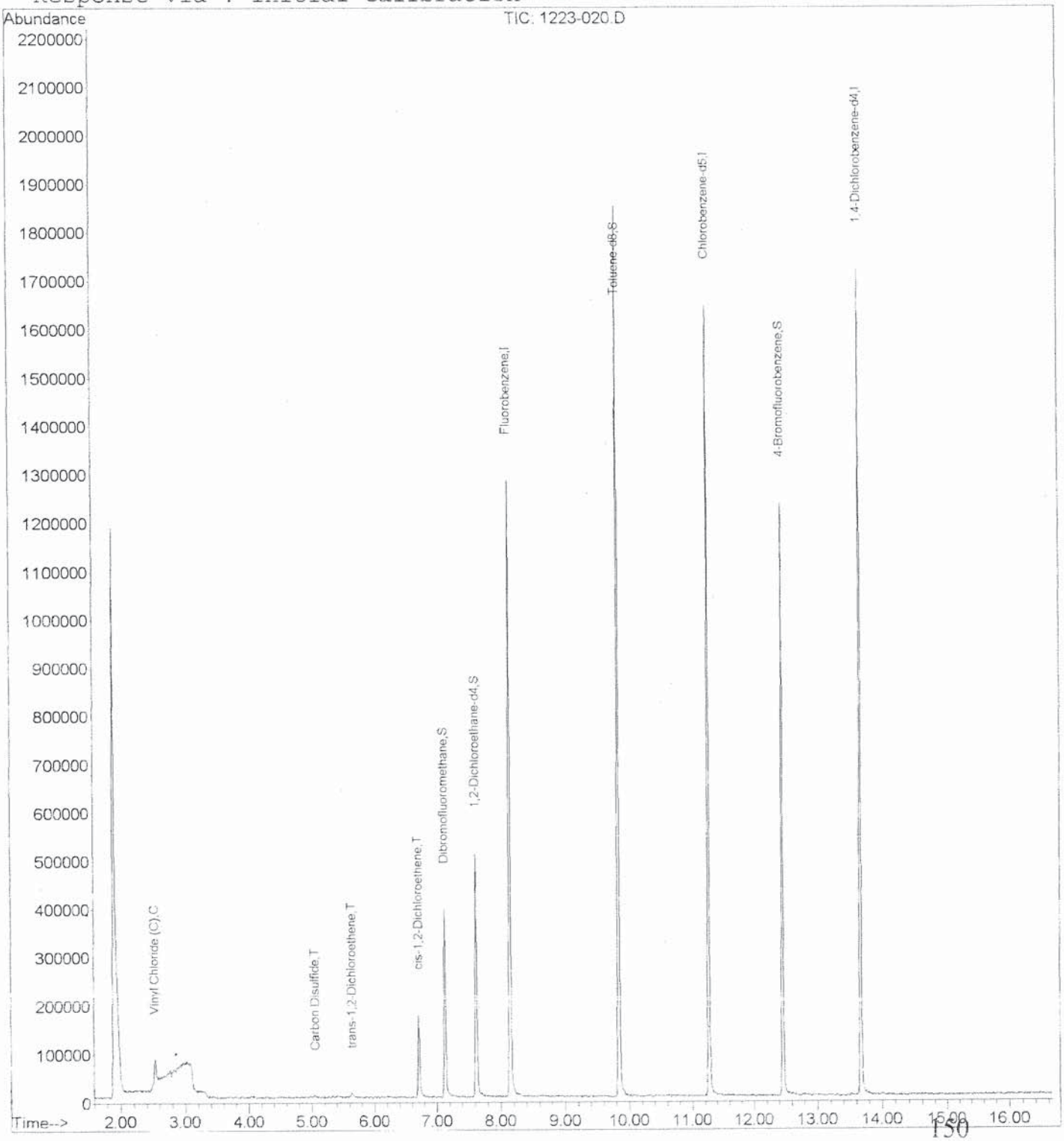
U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File : I:\MS52\DATA\MS52-141223\1223-020.D Vial: 20
Acq On : 23 Dec 2014 8:44 pm Operator: SGA
Sample : J1409737-013 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:46 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0025S-014.5-20141214
Lab Code: J1409737-014

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**0.48**	I	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

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Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0025S-014.5-20141214
Lab Code: J1409737-014

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.12**	J	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	103	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	99	86-113	12/23/14	Acceptable
Dibromofluoromethane	100	86-112	12/23/14	Acceptable
Toluene-d8	108	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-021.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 21:12	**Quant Date:**	12/26/2014 08:47	**Vial:**	21
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-014			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/14/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281350	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	996678	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	490040	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	354848	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	220935	49.87	100	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	298398	51.73	103	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1080576	54.02	108	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	372877	49.39	99	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0		0.11	U	
1	Vinyl Chloride				62	0d		0.22	U	
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.05	0.02	0.00	43	10161	3.84	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.05		0.00	76	6409	0.2700	3.0	U	
1	trans-1,2-Dichloroethene	5.65	0.01	0.00	61	1438	0.1200	0.12	J	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
c: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-021.D		
Acqu Date:	12/23/2014 21:12	**Quant Date:**	12/26/2014 08:47
Run Type:	SMPL		
Lab ID:	J1409737-014		

Instrument:	ms52
Vial:	21
Dilution:	1.0
Soln Conc. Units:	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.72	0.01	0.00	61	5696	0.4800	0.48	J	
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

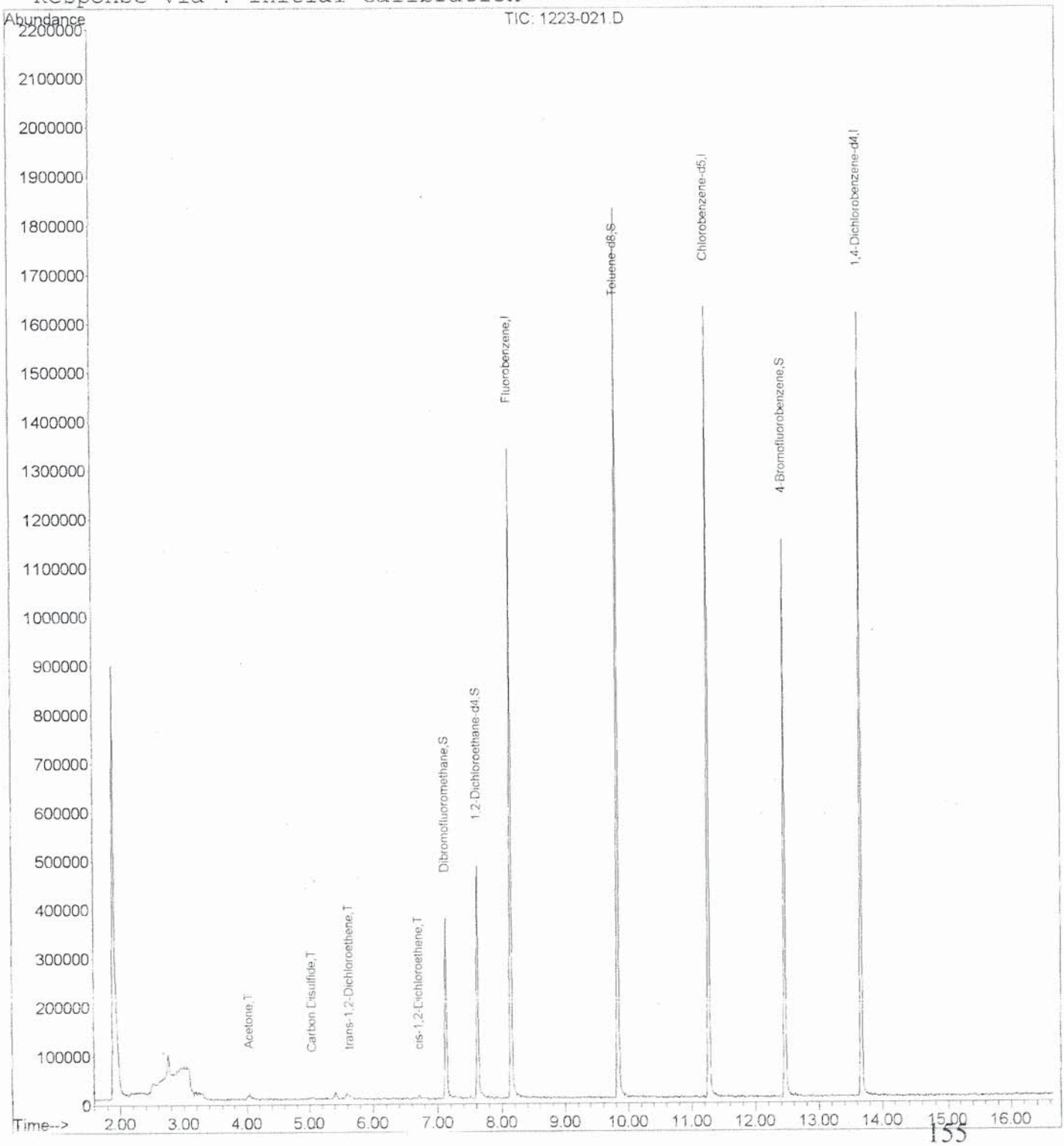
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than lowest pt of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-021.D Vial: 21
Acq On : 23 Dec 2014 9:12 pm Operator: SGA
Sample : J1409737-014 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:47 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0026S-017.5-20141214
Lab Code: J1409737-015

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**2.3**		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0026S-017.5-20141214
Lab Code: J1409737-015

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**1.0**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**21**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	106	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	100	86-113	12/23/14	Acceptable
Dibromofluoromethane	100	86-112	12/23/14	Acceptable
Toluene-d8	109	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-022.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 21:39	**Quant Date:**	12/26/2014 08:47	**Vial:**	22
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-015			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/14/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281351	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	977360	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	475351	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	345231	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	217544	50.07	100	86-112	OK	
1	1,2-Dichloroethane-d4	7.63	0.00	0.00	65	299122	52.88	106	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1056250	54.44	109	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	366947	49.96	100	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride	2.53	0.01	0.00	62	186264	20.61	21		
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.04	0.01	0.00	43	6394	2.47	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.04	-0.01	0.00	76	4874	0.2100	3.0	U	
1	trans-1,2-Dichloroethene	5.65	0.01	0.00	61	11632	1.00	1.0		
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-022.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 21:39	**Quant Date:**	12/26/2014 08:47	**Vial:**	22
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-015			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.72	0.01	0.00	61	26913	2.32	2.3		
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (E				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

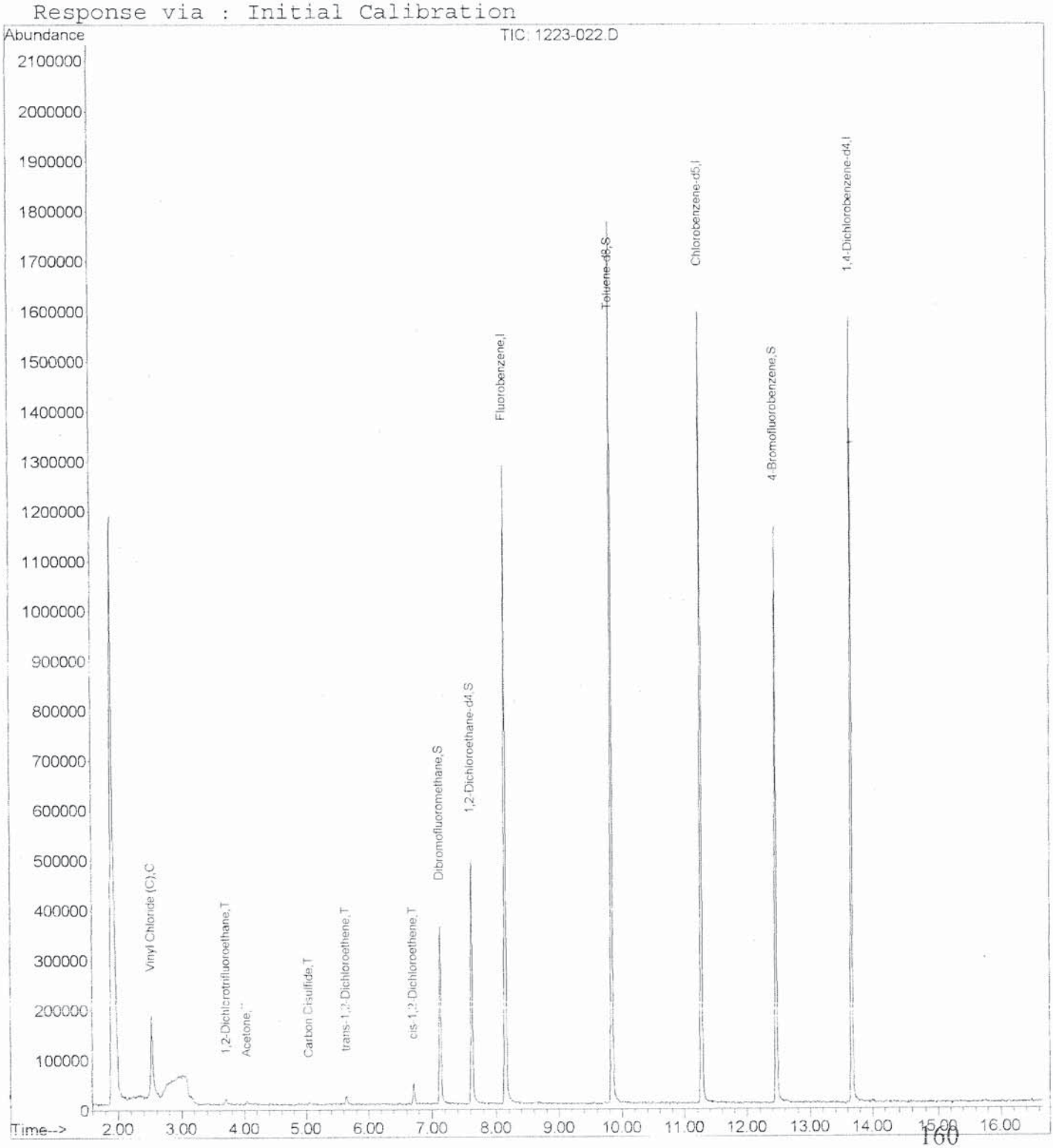
U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File : I:\MS52\DATA\MS52-141223\1223-022.D Vial: 22
Acq On : 23 Dec 2014 9:39 pm Operator: SGA
Sample : J1409737-015 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:47 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0028I-024.5-20141214
Lab Code: J1409737-016

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**5.3**		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/14/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-21ST-MW0028I-024.5-20141214
Lab Code: J1409737-016

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**0.33**	I	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**11**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	104	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	100	86-113	12/23/14	Acceptable
Dibromofluoromethane	106	86-112	12/23/14	Acceptable
Toluene-d8	106	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-023.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 22:06	**Quant Date:**	12/26/2014 08:48	**Vial:**	23
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-016			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/14/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
		Prep Date:	12/23/2014		
Prep Ref:	281352				

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	986282	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	492325	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	346755	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Ree Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	232236	52.97	106	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	297804	52.17	104	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1060278	52.76	106	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	370340	50.20	100	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0		0.11	U	
1	Vinyl Chloride	2.53	0.01	0.00	62	98272	10.78	11		
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.05	0.02	0.00	43	11138	4.26	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.06	0.01	0.00	76	6370	0.2700	3.0	U	
1	trans-1,2-Dichloroethene	5.65	0.01	0.00	61	3911	0.3300	0.33	J	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-023.D		
Acqu Date:	12/23/2014 22:06	**Quant Date:**	12/26/2014 08:48
Run Type:	SMPL		
Lab ID:	J1409737-016		

Instrument:	ms52
Vial:	23
Dilution:	1.0
Soln Conc. Units:	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene	6.72	0.01	0.00	61	62018	5.30	5.3		
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0d		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

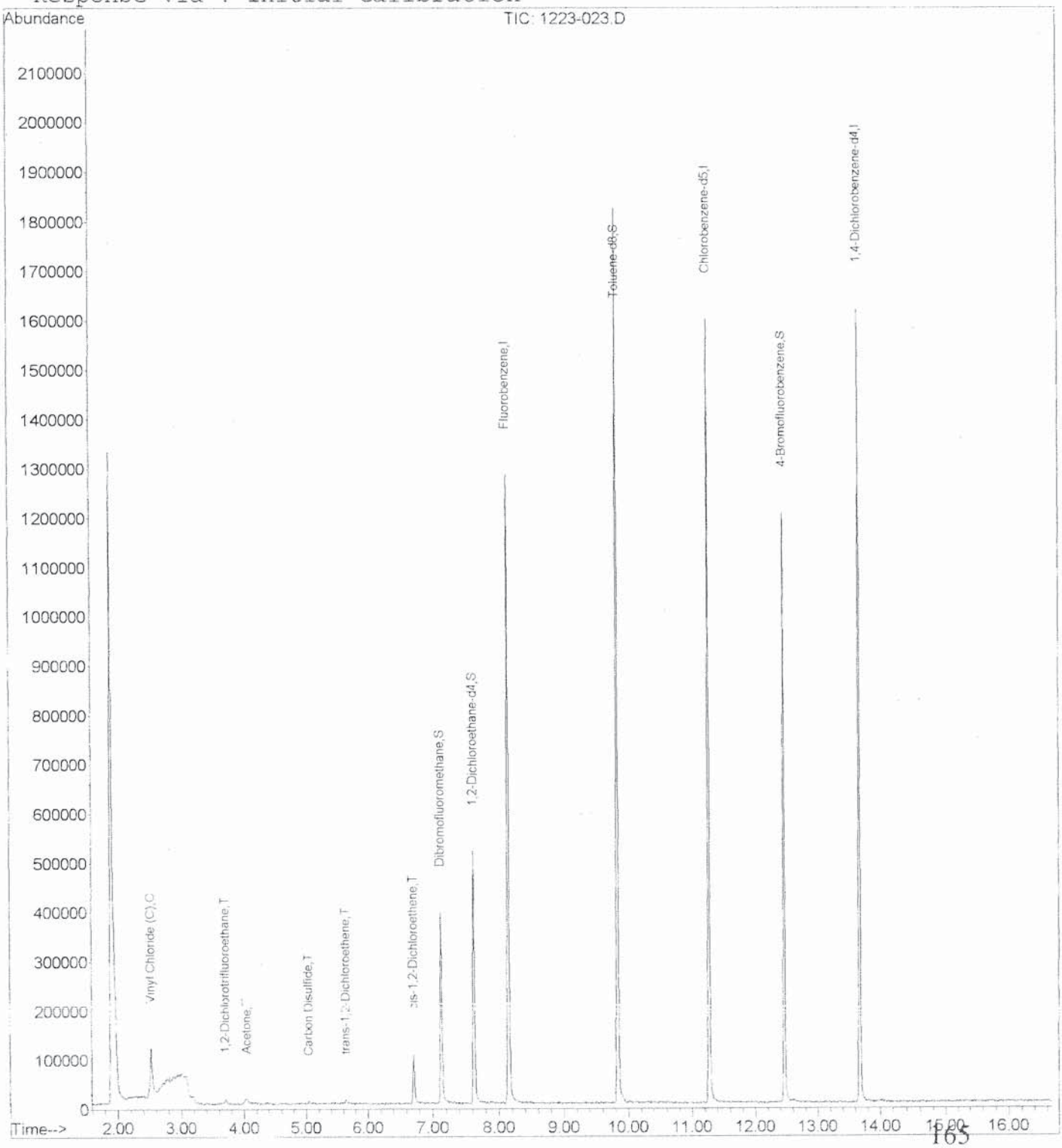
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-023.D Vial: 23
Acq On : 23 Dec 2014 10:06 pm Operator: SGA
Sample : J1409737-016 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:48 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/15/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-DBA-IW0003S-012.0-20141215
Lab Code: J1409737-017

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	ND	U	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/15/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-DBA-IW0003S-012.0-20141215
Lab Code: J1409737-017

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	109	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	103	86-113	12/23/14	Acceptable
Dibromofluoromethane	103	86-112	12/23/14	Acceptable
Toluene-d8	109	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-024.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 22:33	**Quant Date:**	12/26/2014 10:36	**Vial:**	24
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-017			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/15/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281353	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	980584	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	480384	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	339278	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	225517	51.74	103	86-112	OK	
1	1,2-Dichloroethane-d4	7.63	0.00	0.00	65	309846	54.59	109	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1069863	54.56	109	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	372895	51.66	103	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride				62	0		0.22	U	
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.03		0.00	43	11278	4.34	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.06	0.01	0.00	76	6802	0.2900	3.0	U	
1	trans-1,2-Dichloroethene				61	0		0.12	U	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-024.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 22:33	**Quant Date:**	12/26/2014 10:36	**Vial:**	24
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-017			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene				61	0		0.36	U	
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

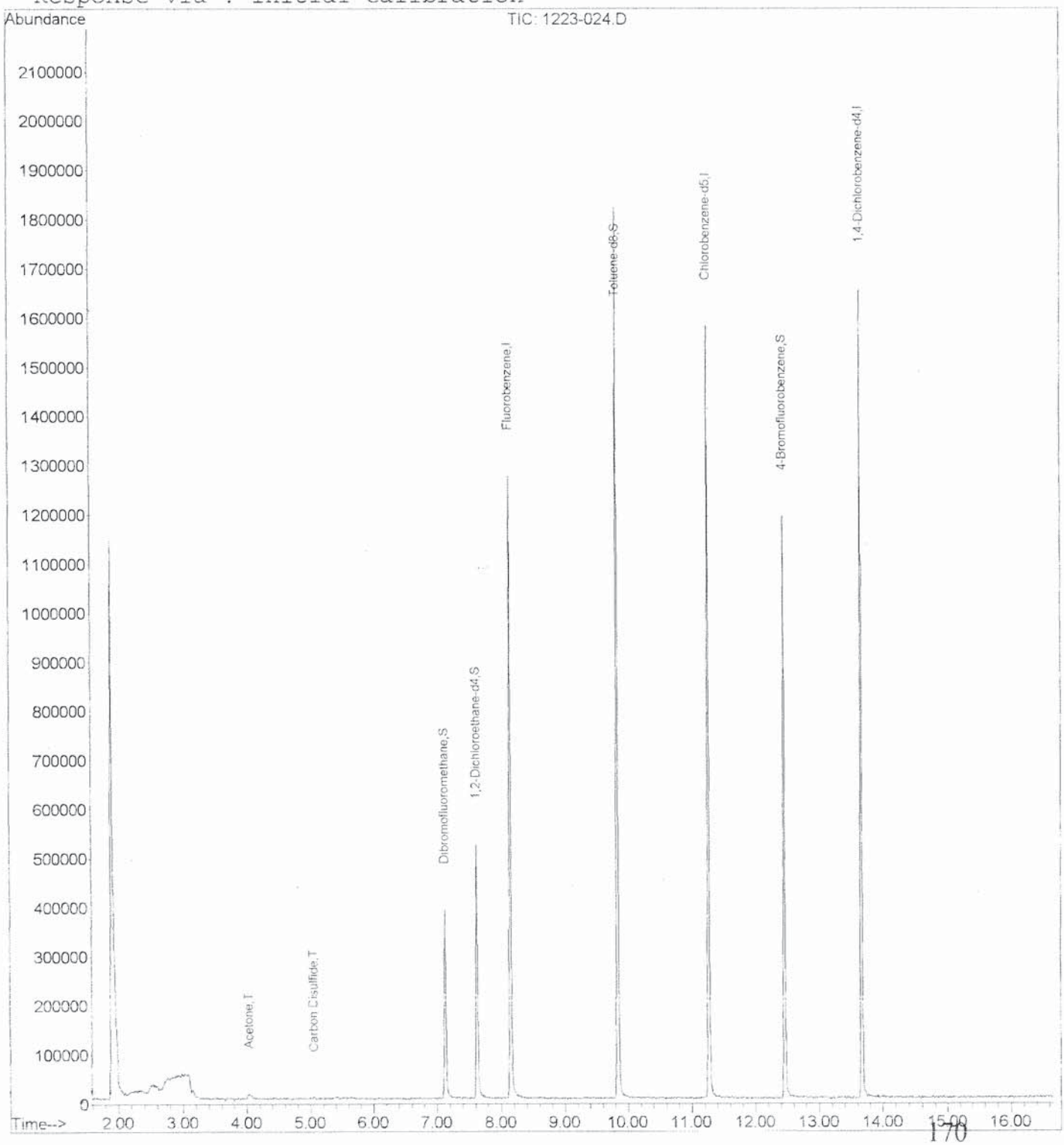
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-024.D Vial: 24
Acq On : 23 Dec 2014 10:33 pm Operator: SGA
Sample : J1409737-017 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 10:36 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/15/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-DBA-IW0003I-035.5-20141215
Lab Code: J1409737-018

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	ND	U	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	ND	U	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	ND	U	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: 12/15/2014
Date Received: 12/16/2014

Volatile Organic Compounds by GC/MS

Sample Name: 39A-DBA-IW0003I-035.5-20141215
Lab Code: J1409737-018

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	111	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	101	86-113	12/23/14	Acceptable
Dibromofluoromethane	105	86-112	12/23/14	Acceptable
Toluene-d8	107	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-025.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 23:00	**Quant Date:**	12/26/2014 10:36	**Vial:**	25
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-018			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**	IV	**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**	12/15/2014	**Receive Date:**	12/16/2014

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	J1409737
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281336	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	Volatile Organic Compounds by GC/MS	**Report List ID:**	LJ793
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D	**Quant based on Report List**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	956754	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	477730	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	332772	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	224066	52.69	105	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	306864	55.41	111	72-121	OK	
2	Toluene-d8	9.83	-0.01	0.00	98	1045589	53.62	107	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	357467	50.49	101	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0d		0.11	U	
1	Vinyl Chloride				62	0		0.22	U	
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0d		0.22	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone	4.04	0.01	0.00	43	14057	5.54	5.6	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	Methylene Chloride				84	0		0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.05		0.00	76	7862	0.3400	3.0	U	
1	trans-1,2-Dichloroethene				61	0		0.12	U	
1	Methyl tert-Butyl Ether				73	0		0.14	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-025.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 23:00	**Quant Date:**	12/26/2014 10:36	**Vial:**	25
Run Type:	SMPL			**Dilution:**	1.0
Lab ID:	J1409737-018			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	1,1-Dichloroethane				63	0		0.13	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	cis-1,2-Dichloroethene				61	0		0.36	U	
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	Cyclohexane				56	0		0.12	U	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
3	Isopropylbenzene				120	0		0.14	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	1,4-Dichlorobenzene				146	0		0.10	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	1,2-Dibromo-3-chloropropane (D				157	0		2.3	U	
3	1,2,4-Trichlorobenzene				180	0		0.21	U	
3	1,2,3-Trichlorobenzene				180	0		0.20	U	

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

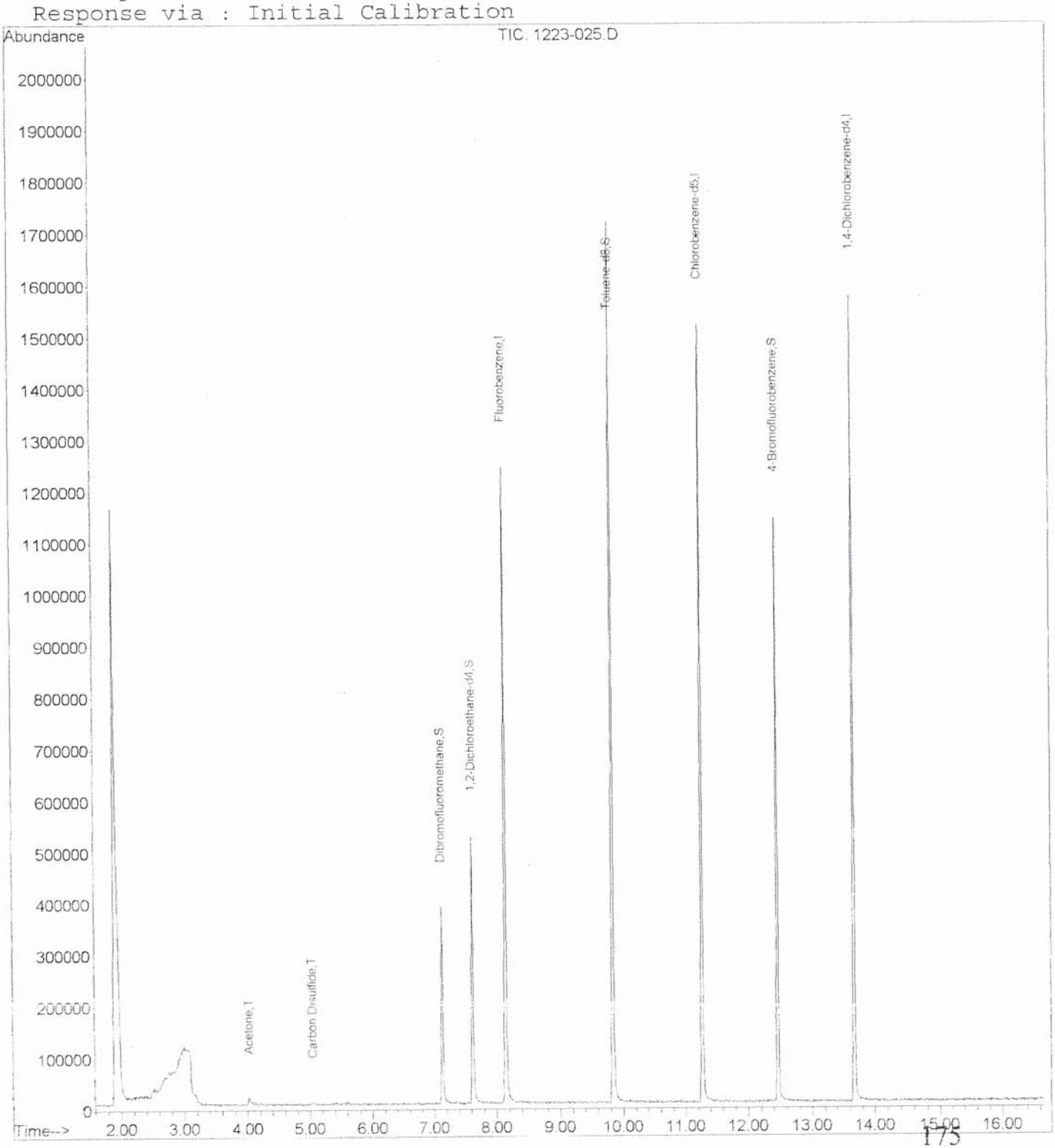
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-025.D Vial: 25
Acq On : 23 Dec 2014 11:00 pm Operator: SGA
Sample : J1409737-018 SAMP Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 10:36 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: NA
Date Received: NA

Volatile Organic Compounds by GC/MS

Sample Name: Method Blank
Lab Code: JWG1500320-3

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	**0.24**	I	10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	ND	U	10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	ND	U	5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	ND	U	1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	ND	U	1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	ND	U	1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	**4.3**		1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	ND	U	10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	ND	U	25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	ND	U	25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	ND	U	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	ND	U	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	ND	U	5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	ND	U	1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	ND	U	2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	ND	U	10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	ND	U	1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	ND	U	5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	ND	U	1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	ND	U	1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	ND	U	1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	ND	U	10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

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Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: NA
Date Received: NA

Volatile Organic Compounds by GC/MS

Sample Name: Method Blank
Lab Code: JWG1500320-3

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	ND	UJ	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	ND	UJ	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	ND	U	2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	ND	U	10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	ND	U	2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	ND	U	5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	ND	U	1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	ND	U	1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	ND	U	1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	ND	U	1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	ND	U	1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	ND	U	1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	ND	U	1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	ND	U	20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	ND	U	20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	ND	U	1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	104	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	99	86-113	12/23/14	Acceptable
Dibromofluoromethane	100	86-112	12/23/14	Acceptable
Toluene-d8	111	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-007.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 14:50	**Quant Date:**	12/26/2014 08:27	**Vial:**	7
Run Type:	MB			**Dilution:**	1.0
Lab ID:	JWG1500320-3			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**		**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**		**Receive Date:**	02/11/2015

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281335	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M			**Calibration ID:**	CAL3292
Title:					
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D			**Method ID:**	MJ100
MB Ref:				**Quant based on Method**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1236744	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	603816	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	449688	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.14	0.01	0.00	111	276066	50.22	100	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	373627	52.20	104	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1362254	55.27	111	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	471451	49.28	99	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane				85	0		0.23	U	
1	Chloromethane				50	0		0.11	U	
1	Vinyl Chloride				62	0		0.22	U	
1	Bromomethane				96	0		0.22	U	
1	Chloroethane				64	0		0.22	U	
1	1,2-Dichloro-1,1,2-trifluoroethan				67	0		0.18	U	
1	Acrolein				56	0		4.2	U	
1	Acetonitrile				41	0		18	U	
1	Trichlorofluoromethane				101	0		0.22	U	
1	Acetone				43	0d		5.6	U	
1	Ethyl Ether				59	0		0.27	U	
1	1,1-Dichloroethene				61	0		0.16	U	
1	tert-Butyl Alcohol				59	0		8.5	U	
1	Iodomethane (Methyl Iodide)				142	0		2.7	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
c: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-007.D		**Instrument:** ms52
Acqu Date:	12/23/2014 14:50	**Quant Date:** 12/26/2014 08:27	**Vial:** 7
Run Type:	MB		**Dilution:** 1.0
Lab ID:	JWG1500320-3		**Soln Conc. Units:** ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Acrylonitrile				53	0		1.2	U	
1	Methylene Chloride	4.98	-0.01	0.00	84	1261	0.1200	0.21	U	
1	Methyl Acetate				43	0		0.84	U	
1	Allyl Chloride				41	0		0.39	U	
1	Trichlorotrifluoroethane				101	0		0.20	U	
1	Carbon Disulfide	5.06	0.01	0.00	76	9438	0.3200	3.0	U	
1	trans-1,2-Dichloroethene				61	0		0.12	U	
1	Methyl tert-Butyl Ether				73	0		0.14	U	
1	1,1-Dichloroethane				63	0		0.13	U	
1	Propionitrile				54	0		3.9	U	
1	Vinyl Acetate				43	0		1.9	U	
1	Chloroprene				53	0		0.13	U	
1	n-Hexane				57	0		0.23	U	
1	2-Butanone (MEK)				43	0		3.8	U	
1	Diisopropyl Ether				45	0		0.20	U	
1	Methacrylonitrile				67	0		1.6	U	
1	cis-1,2-Dichloroethene				61	0		0.36	U	
1	Ethyl Acetate				70	0		4.7	U	
1	Bromochloromethane				130	0		0.27	U	
1	Chloroform				83	0		0.35	U	
1	2,2-Dichloropropane				77	0		0.18	U	
1	tert-Butyl Ethyl Ether				59	0		0.51	U	
1	Isobutyl Alcohol				43	0		43	U	
1	Tetrahydrofuran	7.19	0.02	0.00	72	2955	2.22	5.3	U	
1	1,2-Dichloroethane (EDC)				62	0		0.18	U	
1	1,1,1-Trichloroethane (TCA)				97	0		0.17	U	
1	1,1-Dichloropropene				75	0		0.12	U	
1	Cyclohexane				56	0		0.12	U	
1	Isopropyl Acetate				43	0			JN	
1	Carbon Tetrachloride				117	0		0.34	U	
1	Benzene				78	0		0.21	U	
1	tert-Amyl Methyl Ether				43	0		0.59	U	
1	Dibromomethane				93	0		0.18	U	
1	1,2-Dichloropropane				63	0		0.12	U	
1	2-Nitropropane				43	0		1.0	U	
1	Trichloroethene (TCE)				130	0		0.16	U	
1	Bromodichloromethane				83	0		0.17	U	
1	1,4-Dioxane				88	0		40	U	
2	Methyl Methacrylate				69	0		0.27	U	
2	n-Propyl Acetate				43	0		0.43	U	
2	Methylcyclohexane				83	0		0.16	U	
2	2-Chloroethyl Vinyl Ether				63	0		3.0	U	
2	cis-1,3-Dichloropropene				75	0		0.20	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-007.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 14:50	**Quant Date:**	12/26/2014 08:27	**Vial:**	7
Run Type:	MB			**Dilution:**	1.0
Lab ID:	JWG1500320-3			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
2	4-Methyl-2-pentanone (MIBK)				43	0		0.65	U	
2	trans-1,3-Dichloropropene				75	0		0.23	U	
2	1,1,2-Trichloroethane				83	0		0.17	U	
2	Toluene				92	0		0.19	U	
2	1,3-Dichloropropane				76	0		0.15	U	
2	Ethyl Methacrylate				69	0		0.19	U	
2	2-Hexanone				43	0		2.2	U	
2	Dibromochloromethane				129	0		0.19	U	
2	1,2-Dibromoethane (EDB)				107	0		0.17	U	
2	Tetrachloroethene (PCE)				164	0		0.11	U	
2	1,1,1,2-Tetrachloroethane				131	0		0.18	U	
2	1-Chlorohexane				91	0d		0.34	U	
2	Chlorobenzene				112	0		0.16	U	
2	Ethylbenzene				106	0		0.21	U	
2	m,p-Xylenes				106	0		0.41	U	
2	Bromoform				173	0		0.42	U	
2	Cyclohexanone				55	0		10	U	
2	Styrene				104	0		0.29	U	
2	1,1,2,2-Tetrachloroethane				83	0		0.11	U	
2	o-Xylene				106	0		0.14	U	
2	1,2,3-Trichloropropane				110	0		0.42	U	
3	trans-1,4-Dichloro-2-butene				53	0		2.2	U	
3	Isopropylbenzene				120	0		0.14	U	
3	alpha-Pinene				93	0d		0.55	U	
3	Bromobenzene				77	0		0.26	U	
3	n-Propylbenzene				120	0		0.15	U	
3	2-Chlorotoluene				126	0		0.29	U	
3	4-Chlorotoluene				126	0		0.40	U	
3	1,3,5-Trimethylbenzene				120	0		0.14	U	
3	tert-Butylbenzene				91	0		0.33	U	
3	1,2,4-Trimethylbenzene				120	0		0.29	U	
3	sec-Butylbenzene				134	0		0.19	U	
3	1,3-Dichlorobenzene				146	0		0.13	U	
3	d-Limonene				68	0		0.15	U	
3	1,4-Dichlorobenzene	13.70		0.00	146	2083	4.25	4.25		
3	4-Isopropyltoluene				134	0		0.40	U	
3	1,2-Dichlorobenzene				146	0		0.50	U	
3	n-Butylbenzene				92	0		0.25	U	
3	1,2-Dibromo-3-chloropropane (E				157	0		2.3	U	
3	1,3,5-Trichlorobenzene				180	0		0.11	U	
3	1,2,4-Trichlorobenzene	15.77	0.02	0.00	180	1133	0.1400	0.21	U	
3	Naphthalene				128	0d		0.24	U	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-007.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 14:50	**Quant Date:**	12/26/2014 08:27	**Vial:**	7
Run Type:	MB			**Dilution:**	1.0
Lab ID:	JWG1500320-3			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
3	Hexachlorobutadiene				225	0		0.60	U	
3	1,2,3-Trichlorobenzene	16.21	0.01	0.00	180	1554	0.2400	0.240	J	
	1,3-Butadiene				0	0		10	U	NR
	Bis(chloromethyl) Ether				0	0		10	U	NR

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

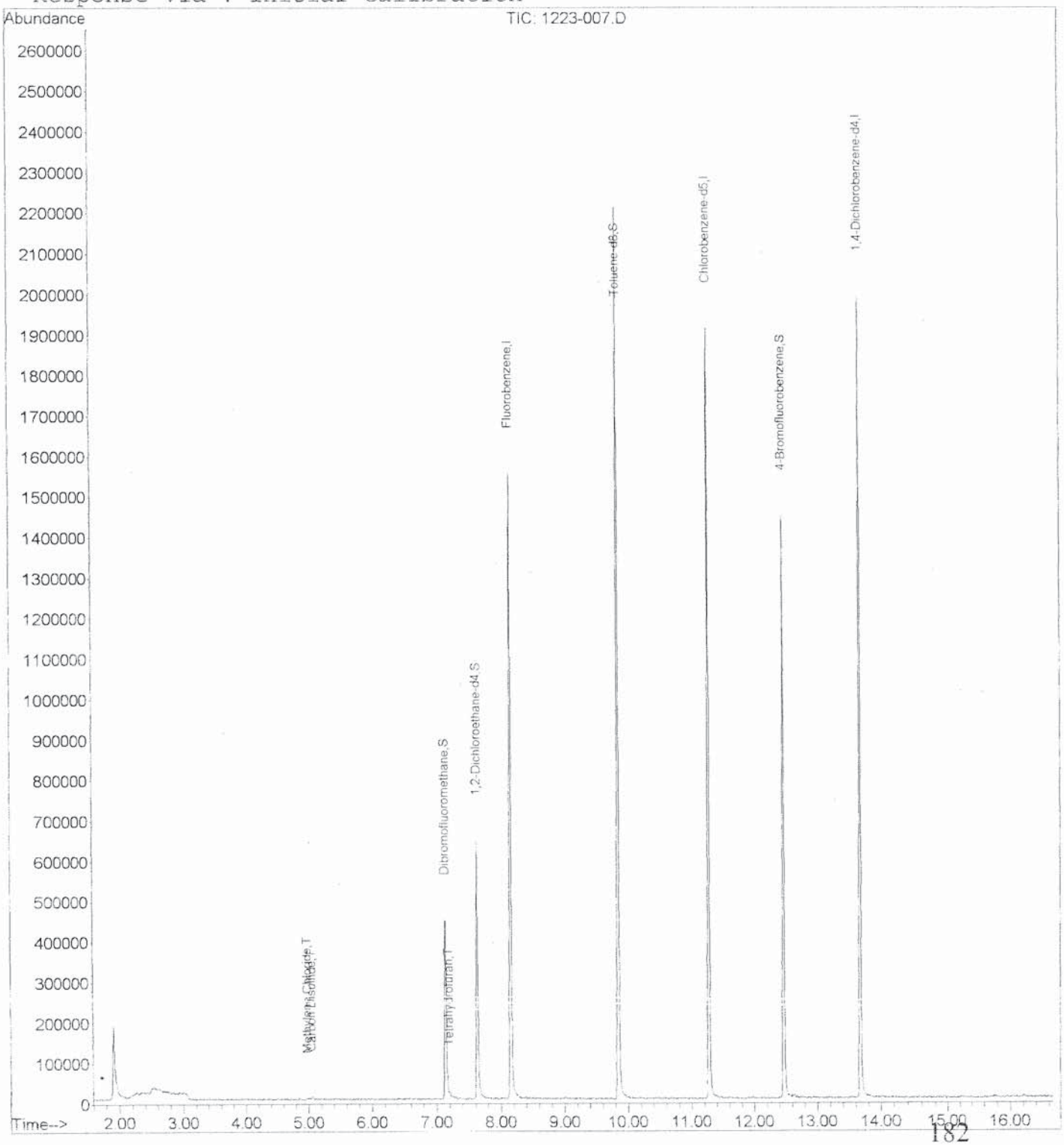
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than lowest cnt of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-007.D Vial: 7
Acq On : 23 Dec 2014 2:50 pm Operator: SGA
Sample : MB Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 29 9:15 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Tetra Tech NUS, Inc.	**Service Request:**	J1409737
Project:	LC39/112G06925	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Volatile Organic Compounds by GC/MS

Sample Name:	Lab Control Sample	**Units:**	ug/L
Lab Code:	JWG1500320-1	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	**48.0**		1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	**44.1**		1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	**51.2**		1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	**48.2**		1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	**48.5**		1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	**48.3**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	**53.8**		10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	**51.2**		10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	**54.3**		5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	**50.0**		1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	**49.2**		1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	**49.2**		1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	**47.5**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	**49.2**		1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	**42.3**	V	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	**47.2**		10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	**52.5**		25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	**53.0**		25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	**45.8**	I	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	**47.9**		1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	**47.1**		5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	**46.4**		1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	**49.0**		2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	**46.8**		5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	**47.6**		10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	**44.4**		1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	**48.8**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	**43.3**		5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	**48.1**		1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	**43.2**		1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**49.1**		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	**51.4**		1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	**45.9**		10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	**47.5**		1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: NA
Date Received: NA

Volatile Organic Compounds by GC/MS

Sample Name: Lab Control Sample
Lab Code: JWG1500320-1

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	**19.1**	I	20	0.23	1	12/23/14	12/23/14	JWG1500320	
Ethylbenzene	**47.3**	J	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	**49.8**		1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	**84.3**		2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	**46.9**		10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	**46.5**		2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	**47.5**		5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	**43.8**		1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	**44.6**		1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	**48.3**		1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	**48.0**		1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**48.8**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	**51.0**		1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	**42.3**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	**41.1**		20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	**50.4**		20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**48.9**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	97	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	103	86-113	12/23/14	Acceptable
Dibromofluoromethane	99	86-112	12/23/14	Acceptable
Toluene-d8	103	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-003.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 12:57	**Quant Date:**	12/26/2014 08:20	**Vial:**	3
Run Type:	LCS			**Dilution:**	1.0
Lab ID:	JWG1500320-1			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**		**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**		**Receive Date:**	02/11/2015

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
		Prep Date:	12/23/2014		
Prep Ref:	281333				

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M			**Calibration ID:**	CAL3292
Title:					
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D			**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D			**Quant based on Method**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1392513	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	722806	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	570357	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	306221	49.47	99	86-112	OK	
1	1,2-Dichloroethane-d4	7.63	0.00	0.00	65	390579	48.46	97	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1512343	51.26	103	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	622851	51.33	103	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane	2.14		0.00	85	243600	19.12	19.1	J	
1	Chloromethane	2.38		0.00	50	506165	43.15	43.2		
1	Vinyl Chloride	2.52		0.00	62	629477	48.89	48.9		
1	Bromomethane	3.01	0.01	0.00	96	184863	46.80	46.8		
1	Chloroethane	3.16	0.01	0.00	64	474040	43.27	43.3		
1	1,2-Dichloro-1,1,2-trifluoroethan	3.71	0.01	0.00	67	645424	44.97	45.0		
1	Acrolein	3.91		0.00	56	55210	140.52	141		
1	Acetonitrile	4.16	0.04	0.00	41	168014	118.94	119		
1	Trichlorofluoromethane	3.70		0.00	101	581573	41.06	41.1		
1	Acetone	4.04	0.01	0.00	43	169030	45.75	45.8	J	
1	Ethyl Ether	4.16		0.00	59	498832	48.14	48.1		
1	1,1-Dichloroethene	4.51	-0.01	0.00	61	795951	48.32	48.3		
1	tert-Butyl Alcohol	4.65	-0.01	0.00	59	183659	203.38	203		
1	Iodomethane (Methyl Iodide)	4.71		0.00	142	345351	47.06	47.1		

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than lowest pt of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-003.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 12:57	**Quant Date:**	12/26/2014 08:20	**Vial:**	3
Run Type:	LCS			**Dilution:**	1.0
Lab ID:	JWG1500320-1			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Acrylonitrile	4.87	0.01	0.00	53	235275	51.07	51.1		
1	Methylene Chloride	4.99		0.00	84	561980	47.48	47.5		
1	Methyl Acetate	4.85		0.00	43	491025	46.87	46.9		
1	Allyl Chloride	4.94		0.00	41	894090	46.93	46.9		
1	Trichlorotrifluoroethane	4.59		0.00	101	449469	50.39	50.4		
1	Carbon Disulfide	5.05		0.00	76	1586273	47.61	47.6		
1	trans-1,2-Dichloroethene	5.64		0.00	61	807646	48.79	48.8		
1	Methyl tert-Butyl Ether	5.63	-0.01	0.00	73	1486677	46.47	46.5		
1	1,1-Dichloroethane	6.02		0.00	63	1039193	48.47	48.5		
1	Propionitrile	6.17	-0.01	0.00	54	81171	43.87	43.9		
1	Vinyl Acetate	6.07	-0.01	0.00	43	1280373	48.57	48.6		
1	Chloroprene	6.27		0.00	53	862889	45.85	45.9		
1	n-Hexane	6.22		0.00	57	996387	41.42	41.4		
1	2-Butanone (MEK)	6.45	0.01	0.00	43	273233	47.23	47.2		
1	Diisopropyl Ether	6.37		0.00	45	2100736	47.93	47.9		
1	Methacrylonitrile	6.61		0.00	67	258366	49.49	49.5		
1	cis-1,2-Dichloroethene	6.71		0.00	61	810752	49.05	49.1		
1	Ethyl Acetate	6.80		0.00	70	67888	47.12	47.1		
1	Bromochloromethane	6.99		0.00	130	292009	47.05	47.1		
1	Chloroform	6.96		0.00	83	902910	48.05	48.1		
1	2,2-Dichloropropane	6.82		0.00	77	701457	44.11	44.1		
1	tert-Butyl Ethyl Ether	6.83	0.01	0.00	59	1820805	46.16	46.2		
1	Isobutyl Alcohol	7.05		0.00	43	14486	41.86	43	U	
1	Tetrahydrofuran	7.17		0.00	72	148146	98.64	98.6		
1	1,2-Dichloroethane (EDC)	7.71	-0.01	0.00	62	742987	49.23	49.2		
1	1,1,1-Trichloroethane (TCA)	7.52		0.00	97	666533	44.10	44.1		
1	1,1-Dichloropropene	7.73	-0.01	0.00	75	820097	48.71	48.7		
1	Cyclohexane	7.79	-0.01	0.00	56	1150948	45.91	45.9		
1	Isopropyl Acetate	7.80		0.00	43	1329410	51.07		JN	
1	Carbon Tetrachloride	7.86		0.00	117	553124	44.40	44.4		
1	Benzene	7.89		0.00	78	2350907	47.88	47.9		
1	tert-Amyl Methyl Ether	8.07		0.00	43	535439	45.62	45.6		
1	Dibromomethane	8.81		0.00	93	350620	46.44	46.4		
1	1,2-Dichloropropane	8.69		0.00	63	676318	47.50	47.5		
1	2-Nitropropane	8.94	-0.01	0.00	43	451017	45.12	45.1		
1	Trichloroethene (TCE)	8.64		0.00	130	497525	42.28	42.3		
1	Bromodichloromethane	8.86		0.00	83	733197	46.40	46.4		
1	1,4-Dioxane	8.84	-0.02	0.00	88	6764	49.85	49.9	J	
2	Methyl Methacrylate	8.81		0.00	69	499147	53.75	53.8		
2	n-Propyl Acetate	8.82	-0.01	0.00	43	946442	52.07	52.1		
2	Methylcyclohexane	9.02		0.00	83	1156840	47.28	47.3		
2	2-Chloroethyl Vinyl Ether	9.22	0.01	0.00	63	371859	45.11	45.1		
2	cis-1,3-Dichloropropene	9.44		0.00	75	999434	51.36	51.4		

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-003.D		**Instrument:** ms52
Acqu Date:	12/23/2014 12:57	**Quant Date:** 12/26/2014 08:20	**Vial:** 3
Run Type:	LCS		**Dilution:** 1.0
Lab ID:	JWG1500320-1		**Soln Conc. Units:** ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
2	4-Methyl-2-pentanone (MIBK)	9.35		0.00	43	626643	53.00	53.0		
2	trans-1,3-Dichloropropene	9.90		0.00	75	918905	50.97	51.0		
2	1,1,2-Trichloroethane	10.06		0.00	83	470214	48.17	48.2		
2	Toluene	9.92	0.01	0.00	92	1484969	47.99	48.0		
2	1,3-Dichloropropane	10.27		0.00	76	982668	50.49	50.5		
2	Ethyl Methacrylate	10.08		0.00	69	838846	49.28	49.3		
2	2-Hexanone	10.20		0.00	43	414671	52.51	52.5		
2	Dibromochloromethane	10.54		0.00	129	507007	47.50	47.5		
2	1,2-Dibromoethane (EDB)	10.75		0.00	107	489992	50.00	50.0		
2	Tetrachloroethene (PCE)	10.65	0.01	0.00	164	369823	48.32	48.3		
2	1,1,1,2-Tetrachloroethane	11.34	-0.01	0.00	131	460045	48.01	48.0		
2	1-Chlorohexane	11.26		0.00	91	927053	47.68	47.7		
2	Chlorobenzene	11.30		0.00	112	1521238	48.75	48.8		
2	Ethylbenzene	11.45		0.00	106	836089	47.28	47.3		
2	m,p-Xylenes	11.56		0.00	106	2250217	84.28	84.3		
2	Bromoform	12.03		0.00	173	312161	48.98	49.0		
2	Cyclohexanone	12.08		0.00	55	47369	118.56	119		
2	Styrene	11.93		0.00	104	1764297	44.60	44.6		
2	1,1,2,2-Tetrachloroethane	12.27	-0.01	0.00	83	695225	51.21	51.2		
2	o-Xylene	11.96	0.01	0.00	106	1050741	43.84	43.8		
2	1,2,3-Trichloropropane	12.40		0.00	110	187840	49.16	49.2		
3	trans-1,4-Dichloro-2-butene	12.42		0.00	53	231363	51.55	51.6		
3	Isopropylbenzene	12.35		0.00	120	713822	49.75	49.8		
3	alpha-Pinene	12.47		0.00	93	1433158	46.64	46.6		
3	Bromobenzene	12.63		0.00	77	1120492	49.79	49.8		
3	n-Propylbenzene	12.76		0.00	120	745980	50.20	50.2		
3	2-Chlorotoluene	12.85		0.00	126	576770	49.10	49.1		
3	4-Chlorotoluene	12.91		0.00	126	633833	50.93	50.9		
3	1,3,5-Trimethylbenzene	12.94	0.01	0.00	120	1095417	50.16	50.2		
3	tert-Butylbenzene	13.28		0.00	91	1576069	55.61	55.6		
3	1,2,4-Trimethylbenzene	13.31		0.00	120	1230898	50.06	50.1		
3	sec-Butylbenzene	13.51		0.00	134	581182	50.71	50.7		
3	1,3-Dichlorobenzene	13.61		0.00	146	1118165	49.20	49.2		
3	d-Limonene	13.70		0.00	68	1086073	47.08	47.1		
3	1,4-Dichlorobenzene	13.70		0.00	146	1235449	42.31	42.3		
3	4-Isopropyltoluene	13.66		0.00	134	678755	46.37	46.4		
3	1,2-Dichlorobenzene	14.02	-0.01	0.00	146	1063660	49.23	49.2		
3	n-Butylbenzene	14.06		0.00	92	1449462	48.53	48.5		
3	1,2-Dibromo-3-chloropropane (D	14.67		0.00	157	112666	54.25	54.3		
3	1,3,5-Trichlorobenzene	15.20	0.01	0.00	180	659545	46.69	46.7		
3	1,2,4-Trichlorobenzene	15.75		0.00	180	529733	51.17	51.2		
3	Naphthalene	15.91		0.00	128	1338285	61.21	61.2		

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-003.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 12:57	**Quant Date:**	12/26/2014 08:20	**Vial:**	3
Run Type:	LCS			**Dilution:**	1.0
Lab ID:	JWG1500320-1			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
3	Hexachlorobutadiene	16.03		0.00	225	260526	48.47	48.5		
3	1,2,3-Trichlorobenzene	16.20		0.00	180	443338	53.75	53.8		
	1,3-Butadiene				0	0		10	U	NR
	Bis(chloromethyl) Ether				0	0		10	U	NR

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

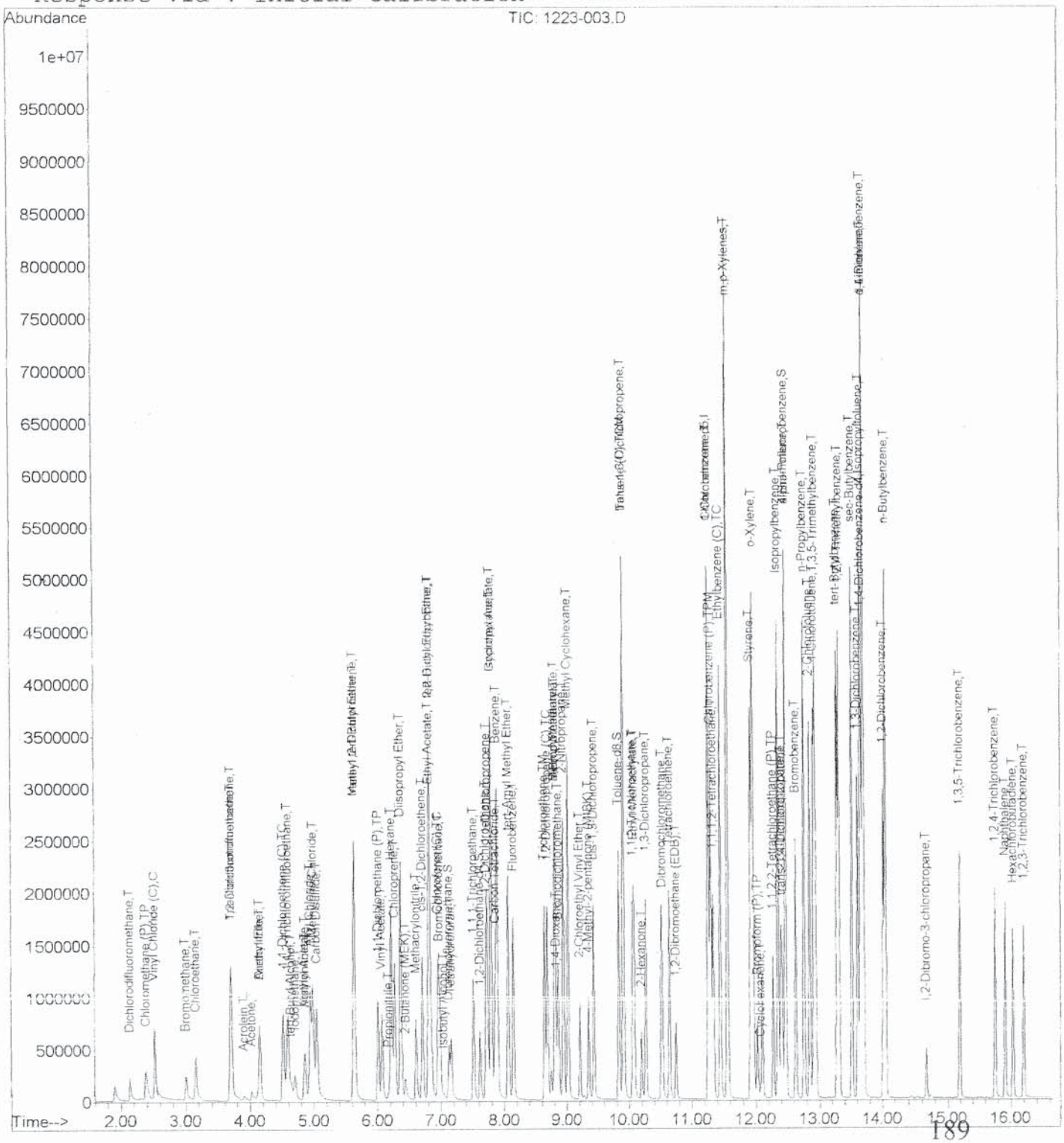
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-003.D Vial: 3
Acq On : 23 Dec 2014 12:57 pm Operator: SGA
Sample : LCS Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:20 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: NA
Date Received: NA

Volatile Organic Compounds by GC/MS

Sample Name: Duplicate Lab Control Sample
Lab Code: JWG1500320-2

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,1,1,2-Tetrachloroethane	**48.9**		1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,1,1-Trichloroethane (TCA)	**46.0**		1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1,2,2-Tetrachloroethane	**49.8**		1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
1,1,2-Trichloroethane	**48.9**		1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethane	**50.1**		1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,1-Dichloroethene	**50.8**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
1,2,3-Trichlorobenzene	**54.0**		10	0.20	1	12/23/14	12/23/14	JWG1500320	
1,2,4-Trichlorobenzene	**51.4**		10	0.21	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromo-3-chloropropane (DBCP	**51.5**		5.0	2.3	1	12/23/14	12/23/14	JWG1500320	
1,2-Dibromoethane (EDB)	**49.5**		1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichlorobenzene	**47.8**		1.0	0.50	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloroethane (EDC)	**50.0**		1.0	0.18	1	12/23/14	12/23/14	JWG1500320	
1,2-Dichloropropane	**48.6**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
1,3-Dichlorobenzene	**48.3**		1.0	0.13	1	12/23/14	12/23/14	JWG1500320	
1,4-Dichlorobenzene	**42.6**	V	1.0	0.10	1	12/23/14	12/23/14	JWG1500320	
2-Butanone (MEK)	**48.9**		10	3.8	1	12/23/14	12/23/14	JWG1500320	
2-Hexanone	**50.5**		25	2.2	1	12/23/14	12/23/14	JWG1500320	
4-Methyl-2-pentanone (MIBK)	**52.2**		25	0.65	1	12/23/14	12/23/14	JWG1500320	
Acetone	**40.3**	I	50	5.6	1	12/23/14	12/23/14	JWG1500320	
Benzene	**49.1**		1.0	0.21	1	12/23/14	12/23/14	JWG1500320	
Bromochloromethane	**47.8**		5.0	0.27	1	12/23/14	12/23/14	JWG1500320	
Bromodichloromethane	**46.4**		1.0	0.17	1	12/23/14	12/23/14	JWG1500320	
Bromoform	**47.6**		2.0	0.42	1	12/23/14	12/23/14	JWG1500320	
Bromomethane	**53.7**		5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Carbon Disulfide	**50.5**		10	3.0	1	12/23/14	12/23/14	JWG1500320	
Carbon Tetrachloride	**46.6**		1.0	0.34	1	12/23/14	12/23/14	JWG1500320	
Chlorobenzene	**50.6**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Chloroethane	**34.2**		5.0	0.22	1	12/23/14	12/23/14	JWG1500320	
Chloroform	**49.2**		1.0	0.35	1	12/23/14	12/23/14	JWG1500320	
Chloromethane	**38.6**		1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
cis-1,2-Dichloroethene	**50.0**		1.0	0.36	1	12/23/14	12/23/14	JWG1500320	
cis-1,3-Dichloropropene	**52.5**		1.0	0.20	1	12/23/14	12/23/14	JWG1500320	
Cyclohexane	**47.0**		10	0.12	1	12/23/14	12/23/14	JWG1500320	
Dibromochloromethane	**48.3**		1.0	0.19	1	12/23/14	12/23/14	JWG1500320	

Comments:

Analytical Results

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925
Sample Matrix: Water

Service Request: J1409737
Date Collected: NA
Date Received: NA

Volatile Organic Compounds by GC/MS

Sample Name: Duplicate Lab Control Sample
Lab Code: JWG1500320-2

Extraction Method: EPA 5030B
Analysis Method: 8260B

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Dichlorodifluoromethane	**20.9**	J	20	0.23	1	12/23/14	12/23/14	JWG1500320	J(3)
Ethylbenzene	**50.4**	J	1.0	0.21	1	12/23/14	12/23/14	JWG1500320	J(3)
Isopropylbenzene	**48.9**		1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
m,p-Xylenes	**88.5**		2.0	0.41	1	12/23/14	12/23/14	JWG1500320	
Methyl Acetate	**45.1**		10	0.84	1	12/23/14	12/23/14	JWG1500320	
Methyl tert-Butyl Ether	**45.5**		2.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Methylene Chloride	**46.5**		5.0	0.21	1	12/23/14	12/23/14	JWG1500320	
o-Xylene	**45.8**		1.0	0.14	1	12/23/14	12/23/14	JWG1500320	
Styrene	**46.8**		1.0	0.29	1	12/23/14	12/23/14	JWG1500320	
Tetrachloroethene (PCE)	**51.4**		1.0	0.11	1	12/23/14	12/23/14	JWG1500320	
Toluene	**50.5**		1.0	0.19	1	12/23/14	12/23/14	JWG1500320	
trans-1,2-Dichloroethene	**51.6**		1.0	0.12	1	12/23/14	12/23/14	JWG1500320	
trans-1,3-Dichloropropene	**51.8**		1.0	0.23	1	12/23/14	12/23/14	JWG1500320	
Trichloroethene (TCE)	**44.8**		1.0	0.16	1	12/23/14	12/23/14	JWG1500320	
Trichlorofluoromethane	**42.2**		20	0.22	1	12/23/14	12/23/14	JWG1500320	
Trichlorotrifluoroethane	**52.5**		20	0.20	1	12/23/14	12/23/14	JWG1500320	
Vinyl Chloride	**51.8**		1.0	0.22	1	12/23/14	12/23/14	JWG1500320	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	97	72-121	12/23/14	Acceptable
4-Bromofluorobenzene	99	86-113	12/23/14	Acceptable
Dibromofluoromethane	100	86-112	12/23/14	Acceptable
Toluene-d8	105	88-115	12/23/14	Acceptable

Comments:

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-004.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 13:25	**Quant Date:**	12/26/2014 08:20	**Vial:**	4
Run Type:	DLCS			**Dilution:**	1.0
Lab ID:	JWG1500320-2			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**		**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**		**Receive Date:**	02/11/2015

Analysis Lot:	JWG1500319	**Prep Lot:**	JWG1500320	**Report Group:**	
Analysis Method:	8260B	**Prep Method:**	EPA 5030B		
Prep Ref:	281334	**Prep Date:**	12/23/2014		

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M			**Calibration ID:**	CAL3292
Title:					
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D			**Method ID:**	MJ100
MB Ref:	I:\MS52\DATA\MS52-141223\1223-007.D			**Quant based on Method**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1442456	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	737241	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	615580	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13	0.00	0.00	111	319607	49.85	100	86-112	OK	
1	1,2-Dichloroethane-d4	7.62	-0.01	0.00	65	405458	48.56	97	72-121	OK	
2	Toluene-d8	9.84	0.00	0.00	98	1583231	52.61	105	88-115	OK	
3	4-Bromofluorobenzene	12.46	0.00	0.00	95	645277	49.27	99	86-113	OK	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane	2.14		0.00	85	275918	20.90	20.9		
1	Chloromethane	2.38		0.00	50	463339	38.59	38.6		
1	Vinyl Chloride	2.52		0.00	62	690227	51.75	51.8		
1	Bromomethane	3.01	0.01	0.00	96	225778	53.70	53.7		
1	Chloroethane	3.15		0.00	64	387825	34.17	34.2		
1	1,2-Dichloro-1,1,2-trifluoroethan	3.71	0.01	0.00	67	692491	46.58	46.6		
1	Acrolein	3.91		0.00	56	65760	156.17	156		
1	Acetonitrile	4.15	0.03	0.00	41	160765	109.87	110		
1	Trichlorofluoromethane	3.70		0.00	101	619140	42.20	42.2		
1	Acetone	4.03		0.00	43	154310	40.32	40.3	J	
1	Ethyl Ether	4.16		0.00	59	516489	48.12	48.1		
1	1,1-Dichloroethene	4.51	-0.01	0.00	61	866049	50.76	50.8		
1	tert-Butyl Alcohol	4.64	-0.02	0.00	59	175746	187.88	188		
1	Iodomethane (Methyl Iodide)	4.71		0.00	142	399475	52.27	52.3		

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-004.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 13:25	**Quant Date:**	12/26/2014 08:20	**Vial:**	4
Run Type:	DLCS			**Dilution:**	1.0
Lab ID:	JWG1500320-2			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Acrylonitrile	4.87	0.01	0.00	53	235800	49.42	49.4		
1	Methylene Chloride	4.99		0.00	84	570500	46.53	46.5		
1	Methyl Acetate	4.85		0.00	43	489666	45.12	45.1		
1	Allyl Chloride	4.94		0.00	41	974191	49.36	49.4		
1	Trichlorotrifluoroethane	4.59		0.00	101	484567	52.45	52.5		
1	Carbon Disulfide	5.05		0.00	76	1743703	50.52	50.5		
1	trans-1,2-Dichloroethene	5.65	0.01	0.00	61	884210	51.57	51.6		
1	Methyl tert-Butyl Ether	5.63	-0.01	0.00	73	1508869	45.53	45.5		
1	1,1-Dichloroethane	6.01	-0.01	0.00	63	1112576	50.10	50.1		
1	Propionitrile	6.17	-0.01	0.00	54	83742	43.72	43.7		
1	Vinyl Acetate	6.07	-0.01	0.00	43	1283557	47.00	47.0		
1	Chloroprene	6.27		0.00	53	899687	46.15	46.2		
1	n-Hexane	6.22		0.00	57	1077129	43.06	43.1		
1	2-Butanone (MEK)	6.45	0.01	0.00	43	292882	48.88	48.9		
1	Diisopropyl Ether	6.37		0.00	45	2205051	48.57	48.6		
1	Methacrylonitrile	6.61		0.00	67	268718	49.70	49.7		
1	cis-1,2-Dichloroethene	6.71		0.00	61	856205	50.01	50.0		
1	Ethyl Acetate	6.80		0.00	70	65141	44.38	44.4		
1	Bromochloromethane	6.99		0.00	130	307428	47.82	47.8		
1	Chloroform	6.96		0.00	83	958268	49.23	49.2		
1	2,2-Dichloropropane	6.82		0.00	77	764383	46.09	46.1		
1	tert-Butyl Ethyl Ether	6.83	0.01	0.00	59	1905712	46.64	46.6		
1	Isobutyl Alcohol	7.05		0.00	43	16367	44.41	44.4	J	
1	Tetrahydrofuran	7.17		0.00	72	147927	95.08	95.1		
1	1,2-Dichloroethane (EDC)	7.71	-0.01	0.00	62	782261	50.04	50.0		
1	1,1,1-Trichloroethane (TCA)	7.52		0.00	97	725904	45.98	46.0		
1	1,1-Dichloropropene	7.73	-0.01	0.00	75	888928	50.66	50.7		
1	Cyclohexane	7.79	-0.01	0.00	56	1219221	46.95	47.0		
1	Isopropyl Acetate	7.80		0.00	43	1322794	49.05		JN	
1	Carbon Tetrachloride	7.86		0.00	117	608203	46.57	46.6		
1	Benzene	7.89		0.00	78	2497838	49.11	49.1		
1	tert-Amyl Methyl Ether	8.06	-0.01	0.00	43	565094	46.48	46.5		
1	Dibromomethane	8.81		0.00	93	351448	45.22	45.2		
1	1,2-Dichloropropane	8.69		0.00	63	716289	48.57	48.6		
1	2-Nitropropane	8.94	-0.01	0.00	43	473512	45.73	45.7		
1	Trichloroethene (TCE)	8.64		0.00	130	548873	44.76	44.8		
1	Bromodichloromethane	8.86		0.00	83	759663	46.41	46.4		
1	1,4-Dioxane	8.84	-0.02	0.00	88	5629	40.05	40.1	J	
2	Methyl Methacrylate	8.81		0.00	69	475551	50.21	50.2		
2	n-Propyl Acetate	8.82	-0.01	0.00	43	925644	49.93	49.9		
2	Methylcyclohexane	9.02		0.00	83	1263742	50.64	50.6		
2	2-Chloroethyl Vinyl Ether	9.22	0.01	0.00	63	375100	44.61	44.6		
2	cis-1,3-Dichloropropene	9.44		0.00	75	1042042	52.50	52.5		

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than lowest point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-004.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 13:25	**Quant Date:**	12/26/2014 08:20	**Vial:**	4
Run Type:	DLCS			**Dilution:**	1.0
Lab ID:	JWG1500320-2			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
2	4-Methyl-2-pentanone (MIBK)	9.35		0.00	43	629778	52.22	52.2		
2	trans-1,3-Dichloropropene	9.90		0.00	75	952247	51.79	51.8		
2	1,1,2-Trichloroethane	10.06		0.00	83	486438	48.85	48.9		
2	Toluene	9.91		0.00	92	1595267	50.54	50.5		
2	1,3-Dichloropropane	10.27		0.00	76	1017385	51.25	51.3		
2	Ethyl Methacrylate	10.08		0.00	69	853186	49.14	49.1		
2	2-Hexanone	10.20		0.00	43	406683	50.49	50.5		
2	Dibromochloromethane	10.54		0.00	129	525340	48.26	48.3		
2	1,2-Dibromoethane (EDB)	10.75		0.00	107	494924	49.52	49.5		
2	Tetrachloroethene (PCE)	10.65	0.01	0.00	164	401290	51.40	51.4		
2	1,1,1,2-Tetrachloroethane	11.34	-0.01	0.00	131	478255	48.93	48.9		
2	1-Chlorohexane	11.26		0.00	91	1006375	50.75	50.8		
2	Chlorobenzene	11.30		0.00	112	1609024	50.55	50.6		
2	Ethylbenzene	11.45		0.00	106	908957	50.40	50.4		
2	m,p-Xylenes	11.56		0.00	106	2423040	88.52	88.5		
2	Bromoform	12.03		0.00	173	308777	47.56	47.6		
2	Cyclohexanone	12.08		0.00	55	45042	110.52	111		
2	Styrene	11.93		0.00	104	1883612	46.81	46.8		
2	1,1,2,2-Tetrachloroethane	12.27	-0.01	0.00	83	689024	49.76	49.8		
2	o-Xylene	11.96	0.01	0.00	106	1124565	45.83	45.8		
2	1,2,3-Trichloropropane	12.40		0.00	110	189870	48.72	48.7		
3	trans-1,4-Dichloro-2-butene	12.41	-0.01	0.00	53	219678	45.35	45.4		
3	Isopropylbenzene	12.35		0.00	120	756795	48.87	48.9		
3	alpha-Pinene	12.47		0.00	93	1517727	45.77	45.8		
3	Bromobenzene	12.63		0.00	77	1180861	48.61	48.6		
3	n-Propylbenzene	12.76		0.00	120	815262	50.83	50.8		
3	2-Chlorotoluene	12.85		0.00	126	616279	48.61	48.6		
3	4-Chlorotoluene	12.91		0.00	126	687122	51.16	51.2		
3	1,3,5-Trimethylbenzene	12.94	0.01	0.00	120	1172820	49.75	49.8		
3	tert-Butylbenzene	13.28		0.00	91	1702469	55.65	55.7		
3	1,2,4-Trimethylbenzene	13.31		0.00	120	1340092	50.50	50.5		
3	sec-Butylbenzene	13.52	0.01	0.00	134	638453	51.61	51.6		
3	1,3-Dichlorobenzene	13.62	0.01	0.00	146	1185227	48.32	48.3		
3	d-Limonene	13.70		0.00	68	1189266	47.77	47.8		
3	1,4-Dichlorobenzene	13.70		0.00	146	1341796	42.55	42.6		
3	4-Isopropyltoluene	13.65	-0.01	0.00	134	744568	47.09	47.1		
3	1,2-Dichlorobenzene	14.02	-0.01	0.00	146	1114485	47.79	47.8		
3	n-Butylbenzene	14.06		0.00	92	1576336	48.90	48.9		
3	1,2-Dibromo-3-chloropropane (D	14.67		0.00	157	115455	51.50	51.5		
3	1,3,5-Trichlorobenzene	15.20	0.01	0.00	180	714422	46.86	46.9		
3	1,2,4-Trichlorobenzene	15.75		0.00	180	574072	51.38	51.4		
3	Naphthalene	15.91		0.00	128	1394512	59.09	59.1		

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-004.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 13:25	**Quant Date:**	12/26/2014 08:20	**Vial:**	4
Run Type:	DLCS			**Dilution:**	1.0
Lab ID:	JWG1500320-2			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
3	Hexachlorobutadiene	16.03		0.00	225	284857	49.10	49.1		
3	1,2,3-Trichlorobenzene	16.20		0.00	180	480674	53.99	54.0		
	1,3-Butadiene				0	0		10	U	NR
	Bis(chloromethyl) Ether				0	0		10	U	NR

Prep Amount:	5 ml	**Dilution:**	1.0
Prep Final Vol:	5 ml	**Unit Factor:**	1

Final Concentration = ((Soln Conc x Prep Final Vol x Dilution) / Prep Amount) x Unit Factor

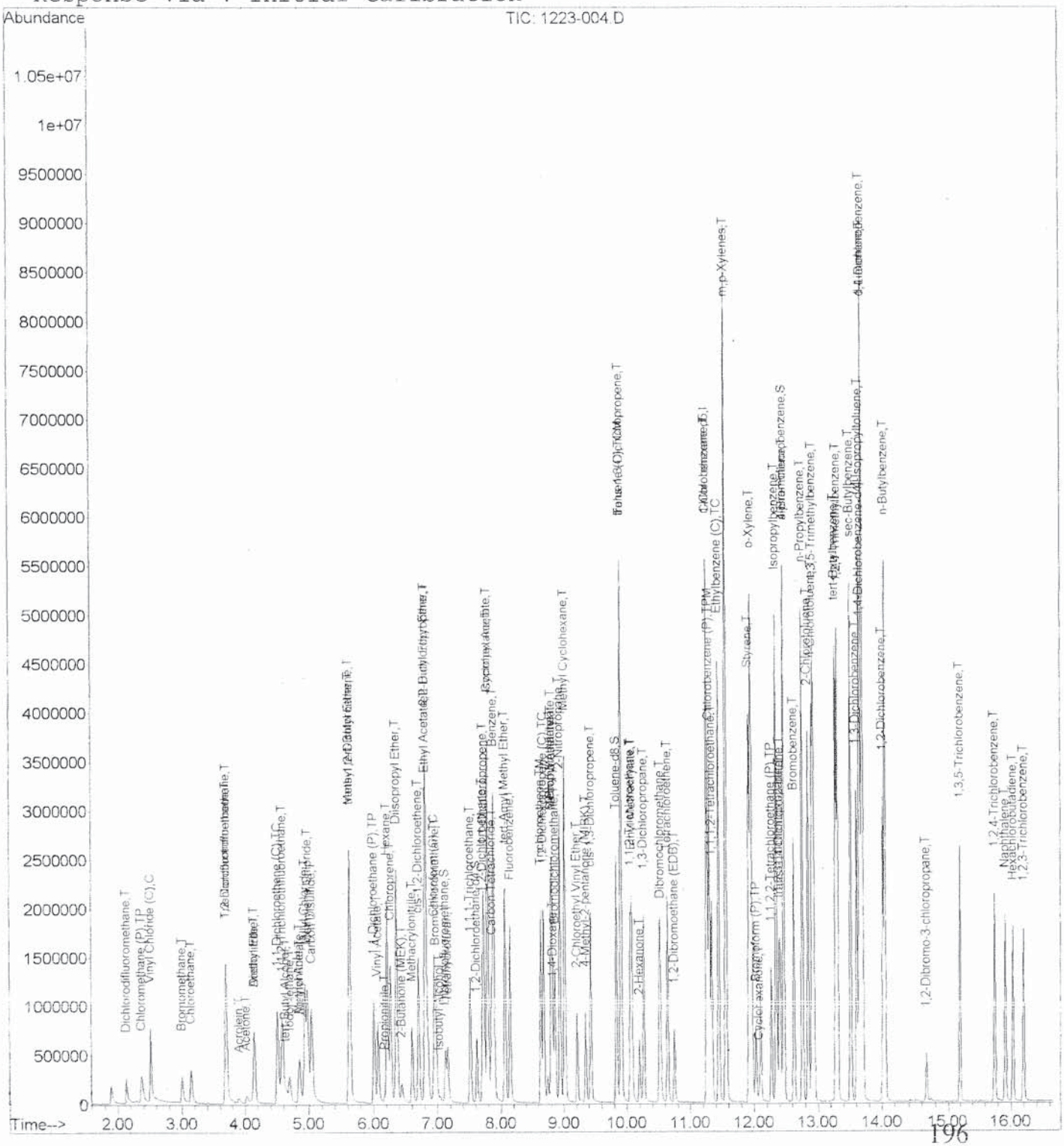
U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File : I:\MS52\DATA\MS52-141223\1223-004.D Vial: 4
Acq On : 23 Dec 2014 1:25 pm Operator: SGA
Sample : LCSD Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 26 8:20 2014 Quant Results File: 141130W.RES

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration



Organic Analysis:
Volatile Organic Compounds by GC/MS

Validation Package

Standards Data

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
Date Analyzed: 12/23/2014
Time Analyzed: 12:03

Tune Summary
Volatile Organic Compounds by GC/MS

File ID: I:\MS52\DATA\MS52-141223\1223-001.D
Instrument ID: ms52
Column:

Analysis Method: 8260B
Analysis Lot: JWG1500319

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
50	95	15	40	21.7	56184	PASS
75	95	30	60	52.3	135550	PASS
95	95	100	100	100.0	259349	PASS
96	95	5	9	6.9	17809	PASS
173	174	0	2	1.1	2023	PASS
174	95	50	120	67.9	176064	PASS
175	174	5	9	8.4	14718	PASS
176	174	95	101	98.9	174165	PASS
177	176	5	9	7.3	12781	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	JWG1500319-2	I:\MS52\DATA\MS52-141223\1223-002.D	12/23/2014	12:30	
Lab Control Sample	JWG1500320-1	I:\MS52\DATA\MS52-141223\1223-003.D	12/23/2014	12:57	
Duplicate Lab Control Sample	JWG1500320-2	I:\MS52\DATA\MS52-141223\1223-004.D	12/23/2014	13:25	
Method Blank	JWG1500320-3	I:\MS52\DATA\MS52-141223\1223-007.D	12/23/2014	14:50	
39A-21ST-TB-121214	J1409737-010	I:\MS52\DATA\MS52-141223\1223-008.D	12/23/2014	15:17	
39A-21ST-MW00119S-017.5-20141213	J1409737-001	I:\MS52\DATA\MS52-141223\1223-009.D	12/23/2014	15:45	
39A-21ST-MW0021S-017.5-20141213	J1409737-002	I:\MS52\DATA\MS52-141223\1223-010.D	12/23/2014	16:12	
39A-21ST-MW0018S-015.5-20141213	J1409737-003	I:\MS52\DATA\MS52-141223\1223-011.D	12/23/2014	16:39	
39A-21ST-MW0017S-016.5-20141213	J1409737-004	I:\MS52\DATA\MS52-141223\1223-012.D	12/23/2014	17:06	
39A-21ST-MW0017I-032.5-20141213	J1409737-005	I:\MS52\DATA\MS52-141223\1223-013.D	12/23/2014	17:33	
39A-21ST-MW0031I-025.5-20141213	J1409737-006	I:\MS52\DATA\MS52-141223\1223-014.D	12/23/2014	18:01	
39A-21ST-MW0032I-025.5-20141213	J1409737-007	I:\MS52\DATA\MS52-141223\1223-015.D	12/23/2014	18:28	
39A-21ST-MW0023S-017.5-20141213	J1409737-008	I:\MS52\DATA\MS52-141223\1223-016.D	12/23/2014	18:55	
39A-21ST-MW0023I-032.5-20141213	J1409737-009	I:\MS52\DATA\MS52-141223\1223-017.D	12/23/2014	19:22	
39A-21ST-MW0014I-024.5-20141214	J1409737-011	I:\MS52\DATA\MS52-141223\1223-018.D	12/23/2014	19:49	
39A-21ST-MW0015I-038.5-20141214	J1409737-012	I:\MS52\DATA\MS52-141223\1223-019.D	12/23/2014	20:17	
39A-21ST-MW0030I-02.5-20141214	J1409737-013	I:\MS52\DATA\MS52-141223\1223-020.D	12/23/2014	20:44	
39A-21ST-MW0025S-014.5-20141214	J1409737-014	I:\MS52\DATA\MS52-141223\1223-021.D	12/23/2014	21:12	
39A-21ST-MW0026S-017.5-20141214	J1409737-015	I:\MS52\DATA\MS52-141223\1223-022.D	12/23/2014	21:39	
39A-21ST-MW0028I-024.5-20141214	J1409737-016	I:\MS52\DATA\MS52-141223\1223-023.D	12/23/2014	22:06	
39A-DBA-IW0003S-012.0-20141215	J1409737-017	I:\MS52\DATA\MS52-141223\1223-024.D	12/23/2014	22:33	
39A-DBA-IW0003I-035.5-20141215	J1409737-018	I:\MS52\DATA\MS52-141223\1223-025.D	12/23/2014	23:00	

Results flagged with an asterisk (*) indicate the analysis performed outside specified tune window

Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-001.D	**Instrument:**	ms52
Acqu Date:	12/23/2014 12:03 **Quant Date:**	**Vial:**	1
Run Type:	BFB	**Dilution:**	1.0
Lab ID:	JWG1500319-1	**Soln Conc. Units:**	

Bottle ID:		**Tier:**		**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**		**Receive Date:**	02/11/2015

Analysis Lot:	JWG1500319	**Prep Lot:**		**Report Group:**	
Analysis Method:	BFB	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:	BFB Tune	**Report List ID:**	LJ159
Tune Ref:		**Method ID:**	MJ101
MB Ref:		**Quant based on Report List**	

Tune Results

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
50	95	15	40	21.7	56184	Pass
75	95	30	60	52.3	135550	Pass
95	95	100	100	100.0	259349	Pass
96	95	5	9	6.9	17809	Pass
173	174	0	2	1.1	2023	Pass
174	95	50	120	67.9	176064	Pass
175	174	5	9	8.4	14718	Pass
176	174	95	101	98.9	174165	Pass
177	176	5	9	7.3	12781	Pass

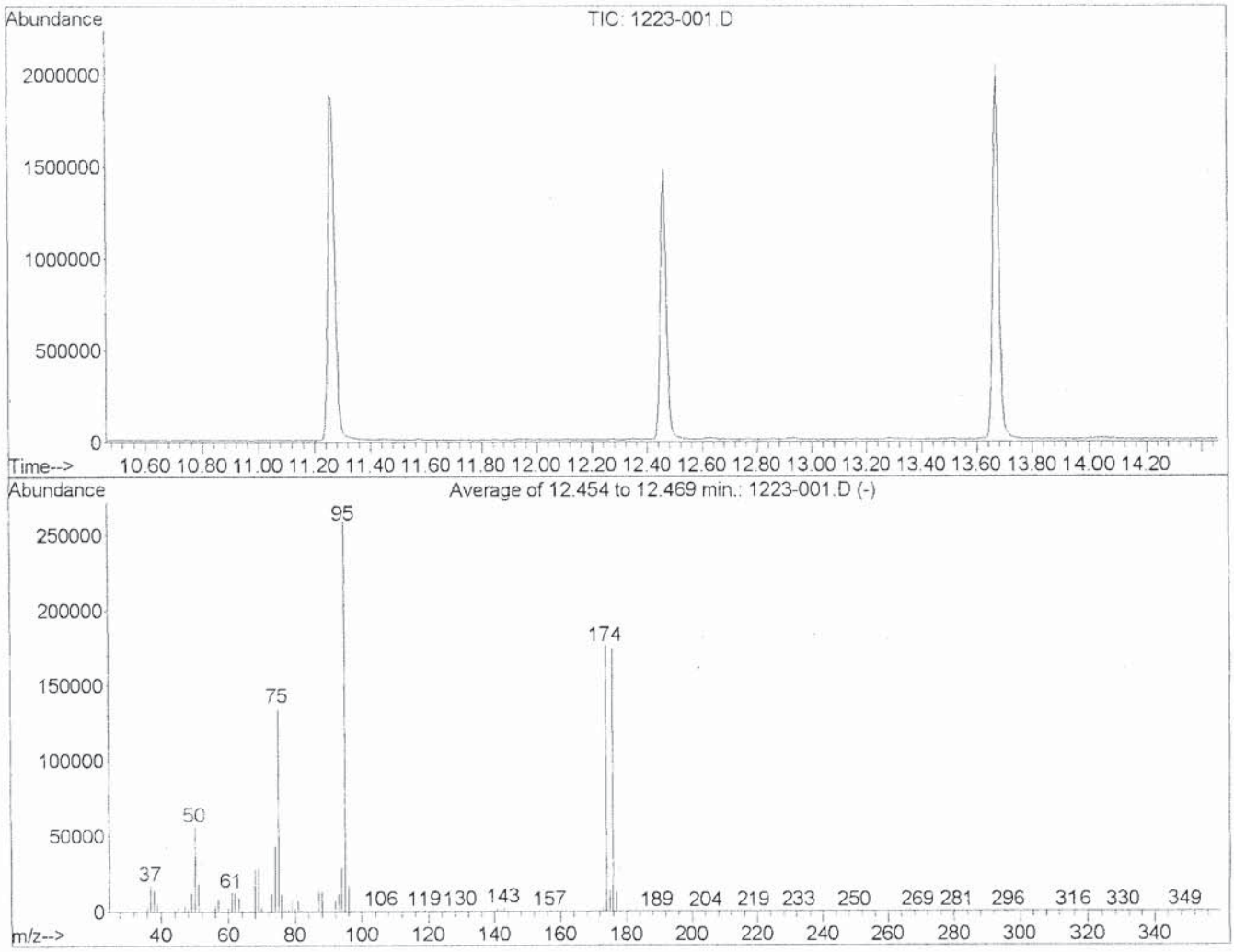
U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

BFB

Data File : I:\MS52\DATA\MS52-141223\1223-001.D Vial: 1
Acq On : 23 Dec 2014 12:03 pm Operator: SGA
Sample : BFB Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260



Spectrum Information: Average of 12.454 to 12.469 min.

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	15	40	21.7	56184	PASS
75	95	30	60	52.3	135550	PASS
95	95	100	100	100.0	259349	PASS
96	95	5	9	6.9	17809	PASS
173	174	0.00	2	1.1	2023	PASS
174	95	50	100	67.9	176064	PASS
175	174	5	9	8.4	14718	PASS
176	174	95	101	98.9	174165	PASS
177	176	5	9	7.3	12781	PASS

1223-001.D 141130W.M Tue Dec 23 13:02:45 2014

12-23-14

Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925 **ICAL Date:** 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292 **Column:** MS
Instrument ID: ms52

Level ID	File ID	Level ID	File ID
A	I:\MS52\DATA\MS52-141128\1128-008.D	F	I:\MS52\DATA\MS52-141128\1128-014.D
B	I:\MS52\DATA\MS52-141128\1128-009.D	G	I:\MS52\DATA\MS52-141128\1128-016.D
C	I:\MS52\DATA\MS52-141128\1128-010.D	H	I:\MS52\DATA\MS52-141128\1128-019.D
D	I:\MS52\DATA\MS52-141128\1128-011.D		
E	I:\MS52\DATA\MS52-141128\1128-012.D		

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
1,1,1,2-Tetrachloroethane	A	1.0	0.493	B	5.0	0.645	C	10	0.636	D	20	0.669	E	50	0.652
	F	100	0.672	G	200	0.707	H	500	0.829						
1,1,1-Trichloroethane (TCA)	A	1.0	0.293	B	5.0	0.501	C	10	0.492	D	20	0.499	E	50	0.508
	F	100	0.539	G	200	0.578	H	500	0.655						
† 1,1,2,2-Tetrachloroethane	A	1.0	0.949	B	5.0	0.976	C	10	1.03	D	20	0.982	E	50	0.933
†	F	100	0.892	G	200	0.895	H	500	0.856						
1,1,2-Trichloroethane	A	1.0	0.698	B	5.0	0.677	C	10	0.679	D	20	0.664	E	50	0.659
	F	100	0.654	G	200	0.671	H	500	0.701						
† 1,1-Dichloroethane	A	1.0	0.609	B	5.0	0.780	C	10	0.773	D	20	0.778	E	50	0.756
†	F	100	0.789	G	200	0.814	H	500	0.860						
‡ 1,1-Dichloroethene	A	1.0	0.457	B	5.0	0.611	C	10	0.596	D	20	0.588	E	50	0.598
‡	F	100	0.612	G	200	0.620	H	500	0.650						
1,2,3-Trichlorobenzene	A	1.0	0.646	B	5.0	0.704	C	10	0.696	D	20	0.723	E	50	0.700
	F	100	0.748	G	200	0.781	H	500	0.786						
1,2,4-Trichlorobenzene	A	1.0	0.824	B	5.0	0.788	C	10	0.824	D	20	0.905	E	50	0.869
	F	100	0.932	G	200	1.01	H	500	1.11						
1,2-Dibromo-3-chloropropane (DBCP	A	1.0	0.165	B	5.0	0.198	C	10	0.204	D	20	0.207	E	50	0.188
	F	100	0.181	G	200	0.165	H	500	0.150						
1,2-Dibromoethane (EDB)	A	1.0	0.659	B	5.0	0.688	C	10	0.674	D	20	0.686	E	50	0.664
	F	100	0.660	G	200	0.668	H	500	0.723						
1,2-Dichlorobenzene	A	1.0	1.65	B	5.0	1.90	C	10	1.87	D	20	1.91	E	50	1.88
	F	100	1.93	G	200	2.03	H	500	1.99						
1,2-Dichloroethane (EDC)	A	1.0	0.520	B	5.0	0.539	C	10	0.542	D	20	0.527	E	50	0.523
	F	100	0.545	G	200	0.562	H	500	0.576						
1,2-Dichloroethane-d4	A	50	0.297	B	50	0.294	C	50	0.302	D	50	0.288	E	50	0.289
	F	50	0.285	G	50	0.286	H	50	0.273						
‡ 1,2-Dichloropropane	A	1.0	0.460	B	5.0	0.486	C	10	0.491	D	20	0.491	E	50	0.496
‡	F	100	0.520	G	200	0.548	H	500	0.597						
1,3-Dichlorobenzene	A	1.0	1.59	B	5.0	2.13	C	10	1.97	D	20	2.04	E	50	1.99
	F	100	2.10	G	200	2.16	H	500	1.96						

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

201

Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925 **ICAL Date:** 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292 **Column:** MS
Instrument ID: ms52

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
1,4-Dichlorobenzene	A	1.0	1.71	B	5.0	2.17	C	10	2.10	D	20	2.20	E	50	2.23
	F	100	2.56	G	200	2.84									
2-Butanone (MEK)				B	5.0	0.176	C	10	0.180	D	20	0.214	E	50	0.213
	F	100	0.227	G	200	0.222	H	500	0.223						
2-Hexanone				B	5.0	0.480	C	10	0.603	D	20	0.582	E	50	0.578
	F	100	0.572	G	200	0.543	H	500	0.466						
4-Bromofluorobenzene	A	50	1.05	B	50	1.07	C	50	1.03	D	50	1.05	E	50	1.05
	F	50	1.06	G	50	1.09	H	50	1.12						
4-Methyl-2-pentanone (MIBK)	A	1.0	0.684	B	5.0	0.858	C	10	0.893	D	20	0.909	E	50	0.870
	F	100	0.839	G	200	0.796	H	500	0.693						
Acetone				B	5.0	0.147	C	10	0.136	D	20	0.139	E	50	0.126
	F	100	0.130	G	200	0.129	H	500	0.122						
Benzene	A	1.0	1.34	B	5.0	1.79	C	10	1.74	D	20	1.72	E	50	1.75
	F	100	1.91	G	200	2.09	H	500	1.76						
Bromochloromethane	A	1.0	0.192	B	5.0	0.217	C	10	0.210	D	20	0.207	E	50	0.206
	F	100	0.219	G	200	0.242	H	500	0.289						
Bromodichloromethane	A	1.0	0.463	B	5.0	0.557	C	10	0.553	D	20	0.544	E	50	0.540
	F	100	0.577	G	200	0.611	H	500	0.694						
† Bromoform	A	1.0	0.218	B	5.0	0.322	C	10	0.397	D	20	0.422	E	50	0.423
†	F	100	0.439	G	200	0.459									
Bromomethane	A	1.0	0.0484	B	5.0	0.0803	C	10	0.0977	D	20	0.0948	E	50	0.109
	F	100	0.150	G	200	0.190	H	500	0.234						
Carbon Disulfide	A	1.0	0.974	B	5.0	1.21	C	10	1.19	D	20	1.17	E	50	1.15
	F	100	1.22	G	200	1.26	H	500	1.41						
Carbon Tetrachloride	A	1.0	0.232	B	5.0	0.386	C	10	0.389	D	20	0.404	E	50	0.415
	F	100	0.446	G	200	0.480	H	500	0.566						
† Chlorobenzene	A	1.0	1.80	B	5.0	2.24	C	10	2.19	D	20	2.11	E	50	2.18
†	F	100	2.22	G	200	2.33	H	500	2.19						
Chloroethane	A	1.0	0.286	B	5.0	0.372	C	10	0.470	D	20	0.452	E	50	0.398
	F	100	0.412	G	200	0.398	H	500	0.359						
‡ Chloroform	A	1.0	0.506	B	5.0	0.634	C	10	0.648	D	20	0.657	E	50	0.661
‡	F	100	0.703	G	200	0.745	H	500	0.845						
† Chloromethane	A	1.0	0.325	B	5.0	0.439	C	10	0.362	D	20	0.452	E	50	0.299
†	F	100	0.430	G	200	0.465									
cis-1,2-Dichloroethene	A	1.0	0.536	B	5.0	0.575	C	10	0.571	D	20	0.591	E	50	0.583
	F	100	0.607	G	200	0.626	H	500	0.659						

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

202

Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925 **ICAL Date:** 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292 **Column:** MS
Instrument ID: ms52

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
cis-1,3-Dichloropropene	A	1.0	1.12	B	5.0	1.35	C	10	1.39	D	20	1.43	E	50	1.41
	F	100	1.38	G	200	1.34	H	500	1.36						
Cyclohexane	A	1.0	0.613	B	5.0	0.852	C	10	0.974	D	20	0.882	E	50	0.905
	F	100	0.966	G	200	1.06	H	500	0.950						
Dibromochloromethane	A	1.0	0.602	B	5.0	0.711	C	10	0.738	D	20	0.726	E	50	0.721
	F	100	0.736	G	200	0.776	H	500	0.896						
Dibromofluoromethane	A	50	0.222	B	50	0.221	C	50	0.224	D	50	0.221	E	50	0.224
	F	50	0.222	G	50	0.221	H	50	0.222						
Dichlorodifluoromethane	A	1.0	0.361	B	5.0	0.470	C	10	0.516	D	20	0.484	E	50	0.482
	F	100	0.453	G	200	0.454	H	500	0.441						
‡ Ethylbenzene	A	1.0	0.856	B	5.0	1.15	C	10	1.19	D	20	1.22	E	50	1.24
‡	F	100	1.28	G	200	1.38	H	500	1.48						
Isopropylbenzene	A	1.0	1.04	B	5.0	1.24	C	10	1.26	D	20	1.30	E	50	1.26
	F	100	1.32	G	200	1.33	H	500	1.31						
m,p-Xylenes	A	2.0	1.09	B	10	1.50	C	20	1.47	D	40	1.56	E	100	1.65
	F	200	1.86	G	400	2.04									
Methyl Acetate	A	1.0	0.371	B	5.0	0.373	C	10	0.383	D	20	0.374	E	50	0.365
	F	100	0.384	G	200	0.383	H	500	0.376						
Methyl tert-Butyl Ether	A	1.0	0.931	B	5.0	1.06	C	10	1.06	D	20	1.06	E	50	1.11
	F	100	1.19	G	200	1.35	H	500	1.44						
Methylene Chloride	A	1.0	0.439	B	5.0	0.409	C	10	0.399	D	20	0.410	E	50	0.402
	F	100	0.419	G	200	0.435	H	500	0.488						
o-Xylene	A	1.0	1.00	B	5.0	1.46	C	10	1.46	D	20	1.48	E	50	1.50
	F	100	1.62	G	200	1.81	H	500	1.79						
Styrene	A	1.0	1.49	B	5.0	2.35	C	10	2.40	D	20	2.48	E	50	2.55
	F	100	2.70	G	200	2.93	H	500	2.55						
Tetrachloroethene (PCE)	A	1.0	0.442	B	5.0	0.509	C	10	0.516	D	20	0.520	E	50	0.541
	F	100	0.560	G	200	0.620									
‡ Toluene	A	1.0	1.74	B	5.0	2.10	C	10	2.14	D	20	2.11	E	50	2.16
‡	F	100	2.29	G	200	2.44	H	500	2.14						
Toluene-d8	A	50	2.28	B	50	2.23	C	50	2.24	D	50	2.12	E	50	2.13
	F	50	1.93	G	50	1.80	H	50	1.61						
trans-1,2-Dichloroethene	A	1.0	0.432	B	5.0	0.567	C	10	0.580	D	20	0.584	E	50	0.598
	F	100	0.634	G	200	0.680	H	500	0.681						
trans-1,3-Dichloropropene	A	1.0	1.01	B	5.0	1.14	C	10	1.25	D	20	1.27	E	50	1.32
	F	100	1.38	G	200	1.41	H	500	1.20						

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

203

Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925 **ICAL Date:** 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292 **Column:** MS
Instrument ID: ms52

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
Trichloroethene (TCE)	A	1.0	0.273	B	5.0	0.358	C	10	0.345	D	20	0.360	E	50	0.372
	F	100	0.421	G	200	0.469									
Trichlorofluoromethane	A	1.0	0.376	B	5.0	0.530	C	10	0.543	D	20	0.489	E	50	0.503
	F	100	0.515	G	200	0.544	H	500	0.570						
Trichlorotrifluoroethane	A	1.0	0.241	B	5.0	0.321	C	10	0.322	D	20	0.318	E	50	0.319
	F	100	0.320	G	200	0.334	H	500	0.386						
‡ Vinyl Chloride	A	1.0	0.424	B	5.0	0.485	C	10	0.512	D	20	0.499	E	50	0.461
‡	F	100	0.468	G	200	0.454	H	500	0.397						

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

Client: Tetra Tech NUS, Inc. **Service Request:** J1409737
Project: LC39/112G06925 **ICAL Date:** 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292 **Column:** MS
Instrument ID: ms52

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
1,1,1,2-Tetrachloroethane	MS	AverageRF	% RSD	14.0		≤ 15	0.663		0.01
1,1,1-Trichloroethane (TCA)	MS	Linear	R2	0.997		≥ 0.99	0.508		0.01
† 1,1,2,2-Tetrachloroethane	MS	AverageRF	% RSD	6.0		≤ 15	0.939		0.3
1,1,2-Trichloroethane	MS	AverageRF	% RSD	2.5		≤ 15	0.675		0.01
† 1,1-Dichloroethane	MS	AverageRF	% RSD	9.4		≤ 15	0.770		0.1
‡ 1,1-Dichloroethene	MS	AverageRF	% RSD	9.8		≤ 15	0.591		0.01
1,2,3-Trichlorobenzene	MS	AverageRF	% RSD	6.5		≤ 15	0.723		0.01
1,2,4-Trichlorobenzene	MS	AverageRF	% RSD	11.9		≤ 15	0.908		0.01
1,2-Dibromo-3-chloropropane (DBCP)	MS	AverageRF	% RSD	11.3		≤ 15	0.182		0.01
1,2-Dibromoethane (EDB)	MS	AverageRF	% RSD	3.2		≤ 15	0.678		0.01
1,2-Dichlorobenzene	MS	AverageRF	% RSD	6.0		≤ 15	1.89		0.01
1,2-Dichloroethane (EDC)	MS	AverageRF	% RSD	3.6		≤ 15	0.542		0.01
1,2-Dichloroethane-d4	SURR	AverageRF	% RSD	3.0		≤ 15	0.289		
‡ 1,2-Dichloropropane	MS	AverageRF	% RSD	8.5		≤ 15	0.511		0.01
1,3-Dichlorobenzene	MS	AverageRF	% RSD	9.1		≤ 15	1.99		0.01
1,4-Dichlorobenzene	MS	Linear	R2	0.996		≥ 0.99	2.26		0.01
2-Butanone (MEK)	MS	AverageRF	% RSD	10.2		≤ 15	0.208		0.01
2-Hexanone	MS	AverageRF	% RSD	9.8		≤ 15	0.546		0.01
4-Bromofluorobenzene	SURR	AverageRF	% RSD	2.7		≤ 15	1.06		
4-Methyl-2-pentanone (MIBK)	MS	AverageRF	% RSD	10.6		≤ 15	0.818		0.01
Acetone	MS	AverageRF	% RSD	6.3		≤ 15	0.133		0.01
Benzene	MS	AverageRF	% RSD	11.9		≤ 15	1.76		0.01
Bromochloromethane	MS	AverageRF	% RSD	13.7		≤ 15	0.223		0.01
Bromodichloromethane	MS	AverageRF	% RSD	11.7		≤ 15	0.567		0.01
† Bromoform	MS	Linear	R2	0.999		≥ 0.99	0.383		0.1
Bromomethane	MS	Quadratic	COD	0.999		≥ 0.99	0.126		0.01
Carbon Disulfide	MS	AverageRF	% RSD	10.1		≤ 15	1.20		0.01
Carbon Tetrachloride	MS	Linear	R2	0.996		≥ 0.99	0.415		0.01
† Chlorobenzene	MS	AverageRF	% RSD	7.3		≤ 15	2.16		0.3
Chloroethane	MS	AverageRF	% RSD	14.5		≤ 15	0.393		0.01
‡ Chloroform	MS	AverageRF	% RSD	14.4		≤ 15	0.675		0.01
† Chloromethane	MS	Linear	R2	0.992		≥ 0.99	0.396		0.1
cis-1,2-Dichloroethene	MS	AverageRF	% RSD	6.3		≤ 15	0.593		0.01
cis-1,3-Dichloropropene	MS	AverageRF	% RSD	7.2		≤ 15	1.35		0.01
Cyclohexane	MS	AverageRF	% RSD	14.7		≤ 15	0.900		0.01
Dibromochloromethane	MS	AverageRF	% RSD	11.0		≤ 15	0.738		0.01
Dibromofluoromethane	SURR	AverageRF	% RSD	0.6		≤ 15	0.222		
Dichlorodifluoromethane	MS	AverageRF	% RSD	10.0		≤ 15	0.458		0.01
‡ Ethylbenzene	MS	AverageRF	% RSD	15.1	*	≤ 15	1.22		0.01
Isopropylbenzene	MS	AverageRF	% RSD	7.4		≤ 15	1.26		0.01
m,p-Xylenes	MS	Linear	R2	0.997		≥ 0.99	1.59		0.01
Methyl Acetate	MS	AverageRF	% RSD	1.8		≤ 15	0.376		0.01

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

205

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
ICAL Date: 11/28/2014

Initial Calibration Summary
Volatile Organic Compounds by GC/MS

ICAL ID: CAL3292
Instrument ID: ms52

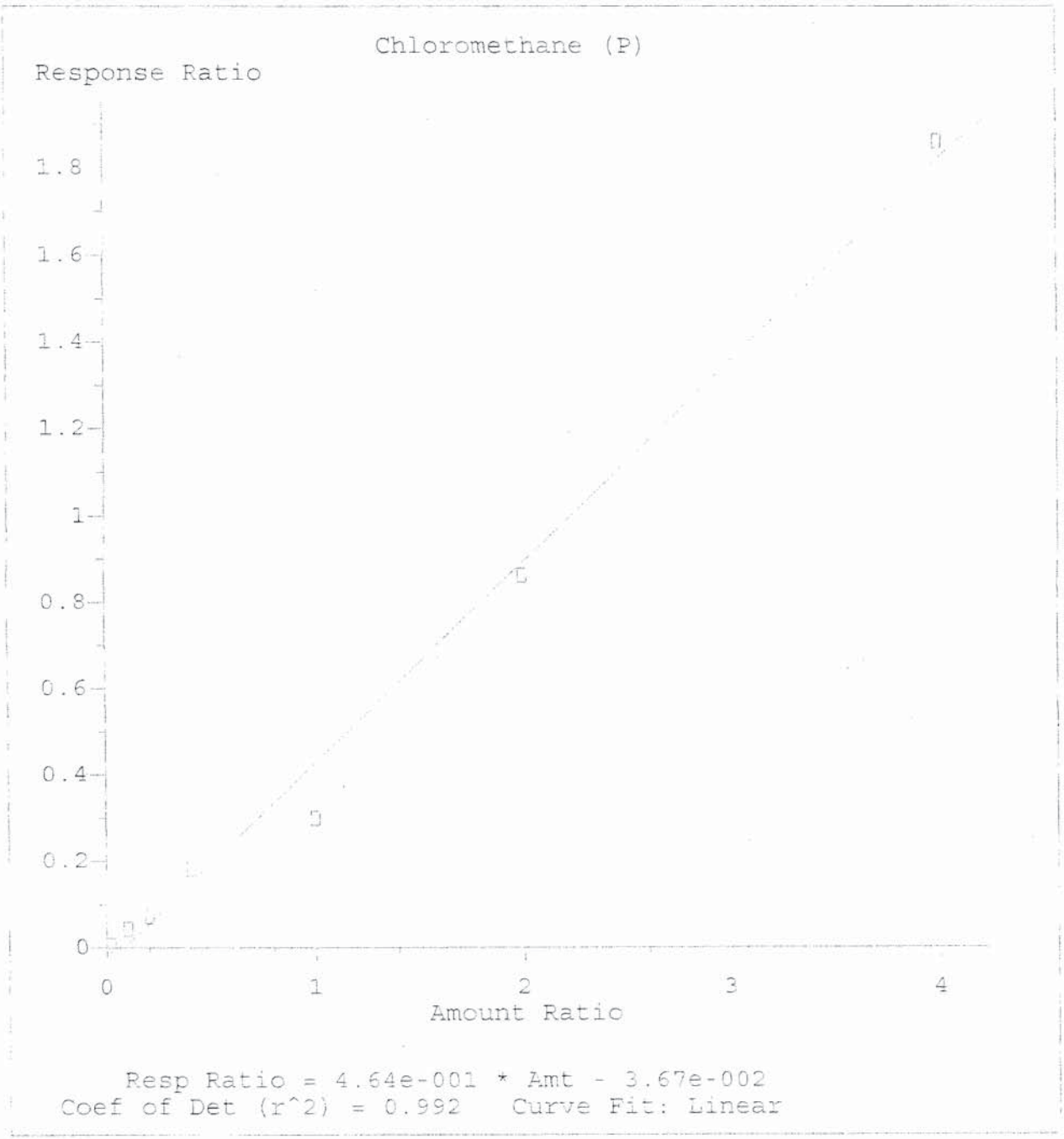
Column: MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
Methyl tert-Butyl Ether	MS	AverageRF	% RSD	14.6		≤ 15	1.15		0.01
Methylene Chloride	MS	AverageRF	% RSD	6.9		≤ 15	0.425		0.01
o-Xylene	MS	Linear	R2	0.999		≥ 0.99	1.52		0.01
Styrene	MS	Linear	R2	0.997		≥ 0.99	2.43		0.01
Tetrachloroethene (PCE)	MS	AverageRF	% RSD	10.2		≤ 15	0.529		0.01
‡ Toluene	MS	AverageRF	% RSD	9.2		≤ 15	2.14		0.01
Toluene-d8	SURR	AverageRF	% RSD	11.7		≤ 15	2.04		
trans-1,2-Dichloroethene	MS	AverageRF	% RSD	13.3		≤ 15	0.594		0.01
trans-1,3-Dichloropropene	MS	AverageRF	% RSD	10.5		≤ 15	1.25		0.01
Trichloroethene (TCE)	MS	Linear	R2	0.996		≥ 0.99	0.371		0.01
Trichlorofluoromethane	MS	AverageRF	% RSD	11.7		≤ 15	0.509		0.01
Trichlorotrifluoroethane	MS	AverageRF	% RSD	12.2		≤ 15	0.320		0.01
‡ Vinyl Chloride	MS	AverageRF	% RSD	8.2		≤ 15	0.462		0.01

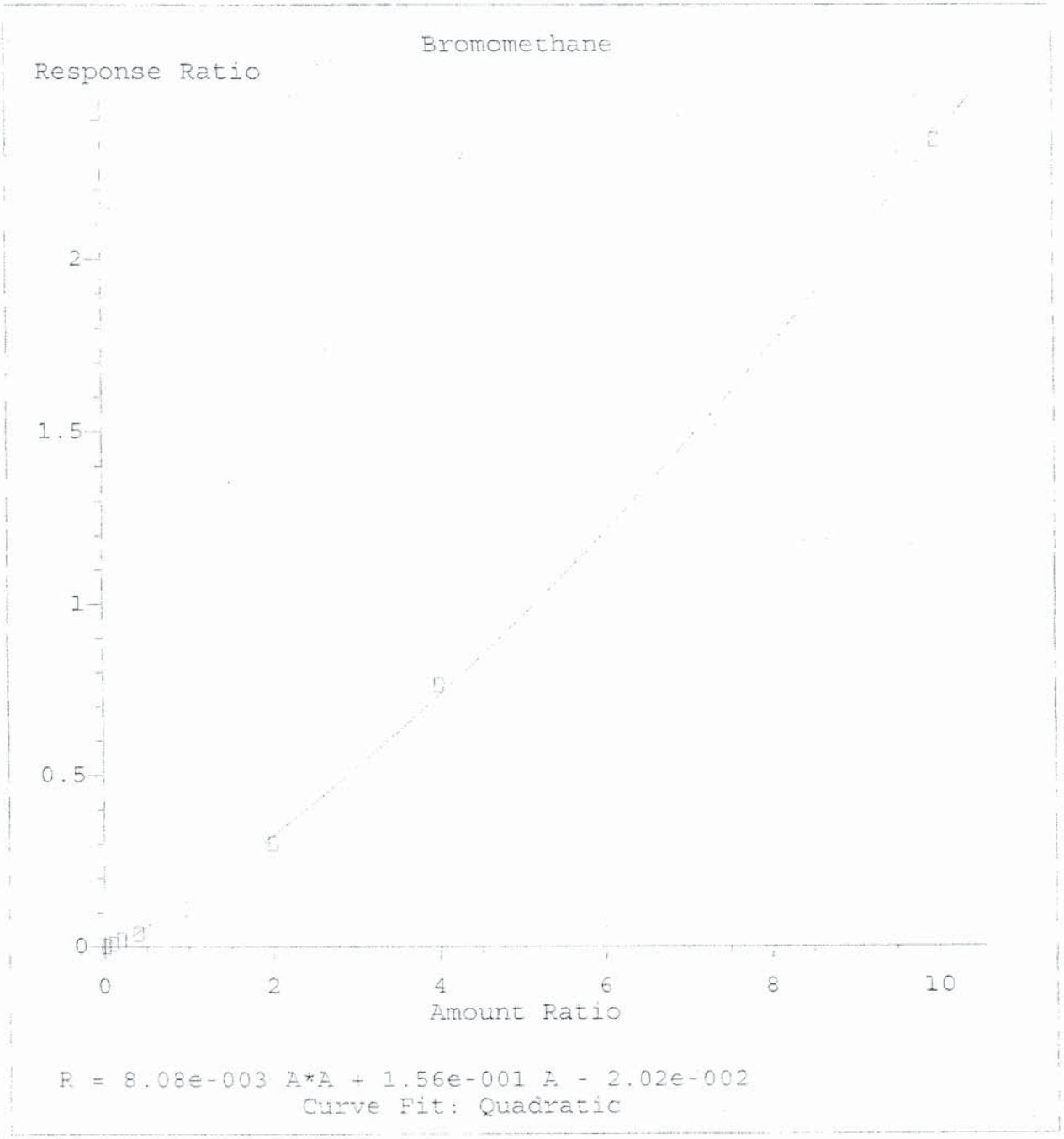
Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

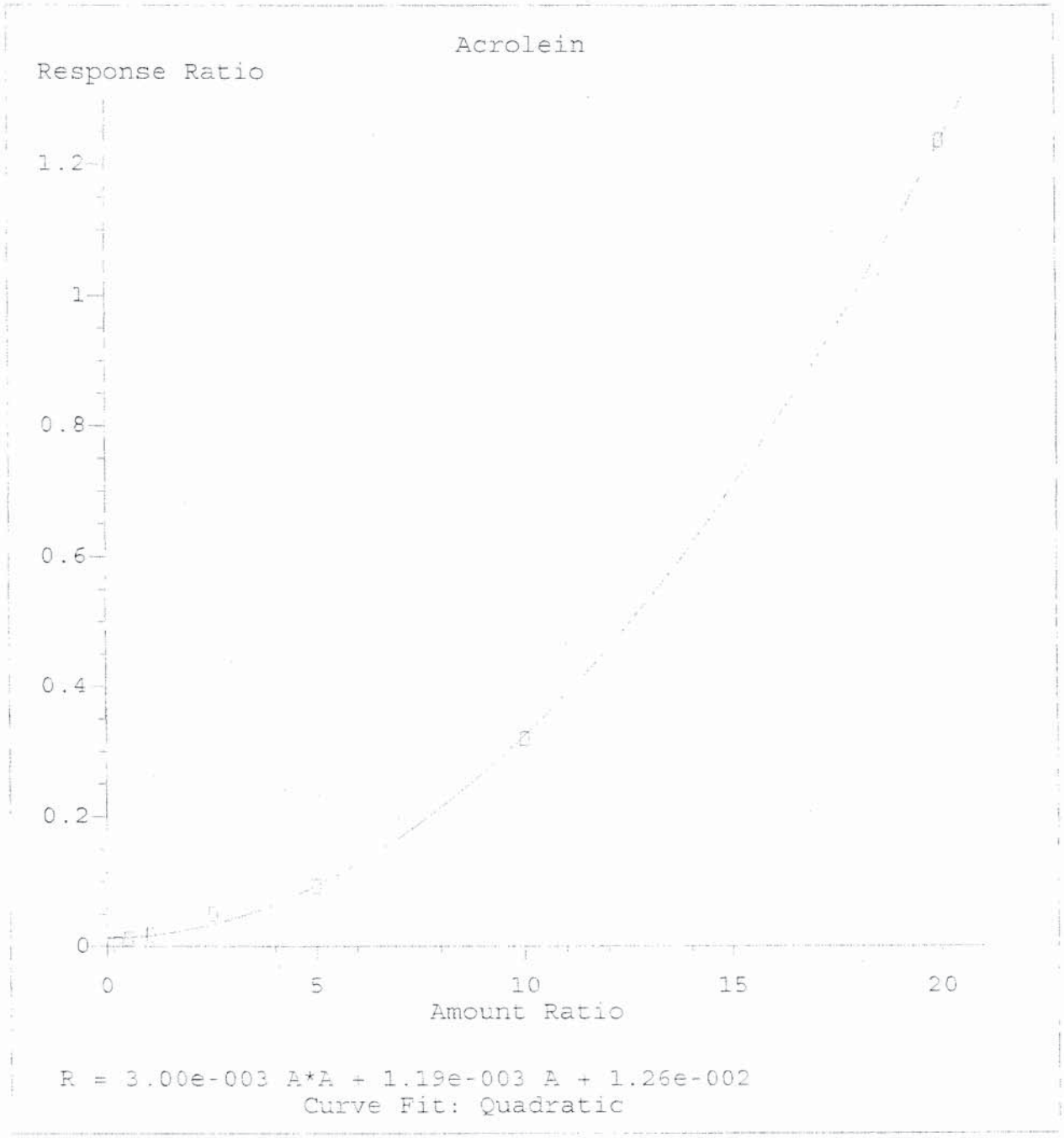
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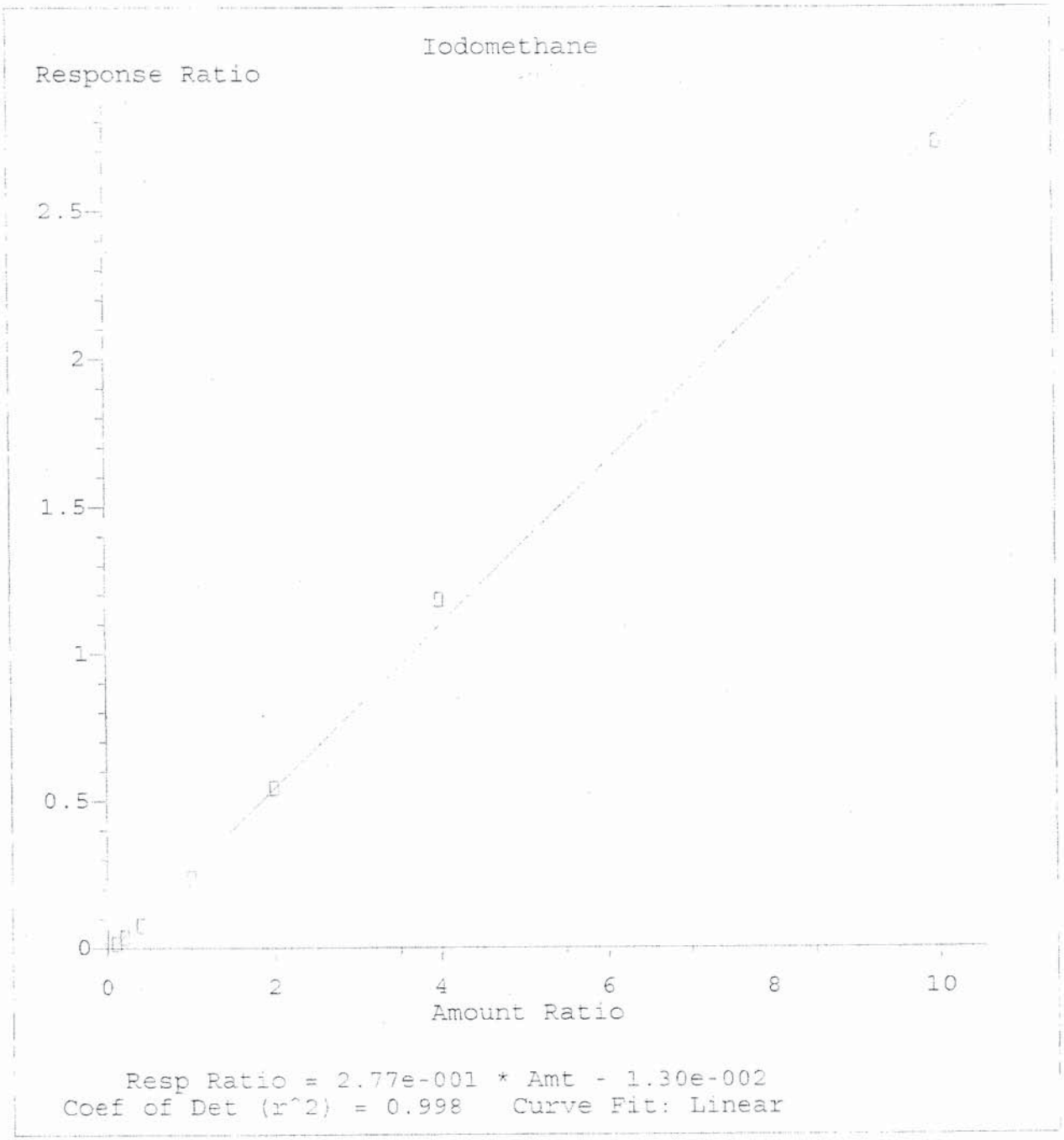
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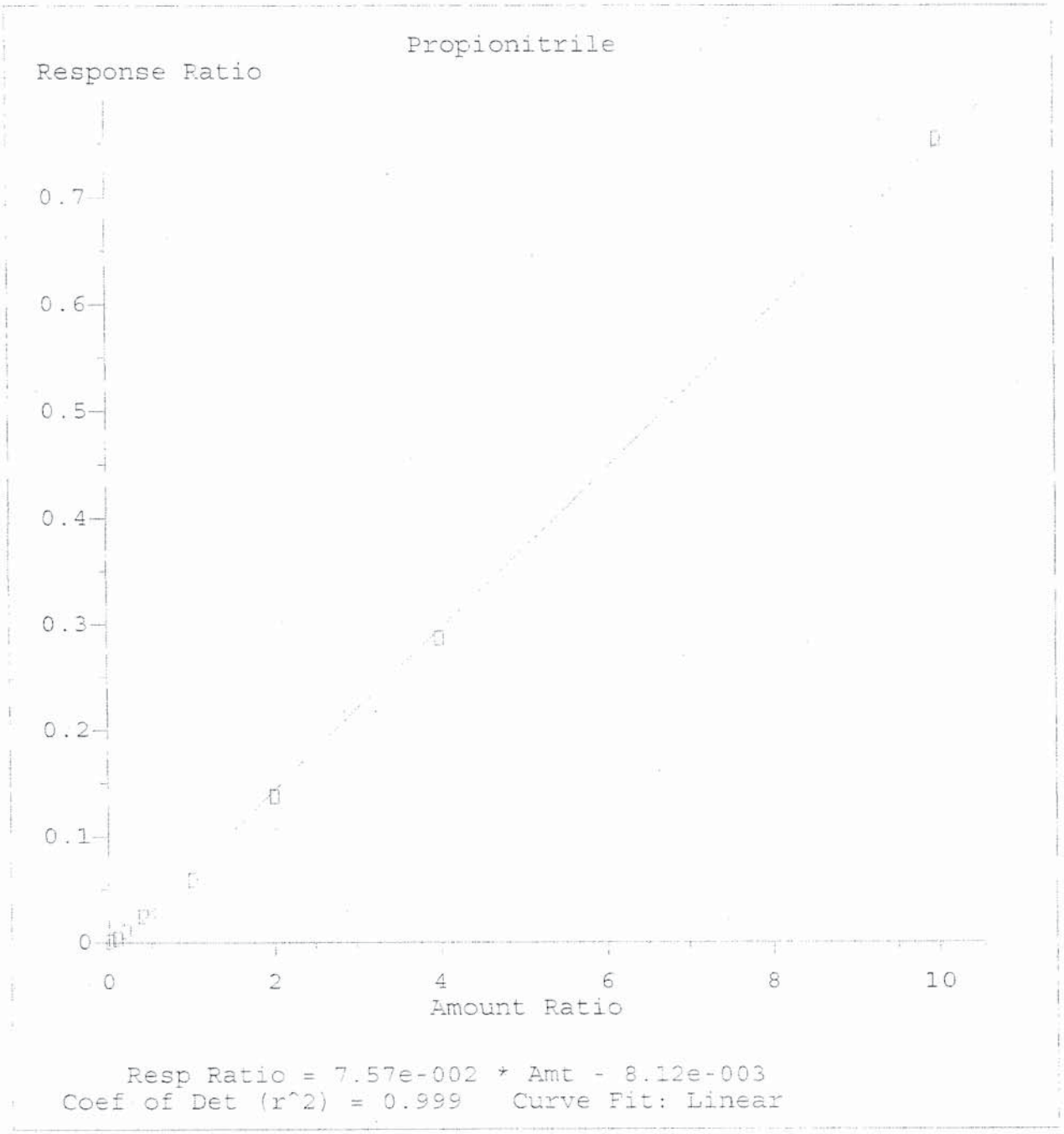
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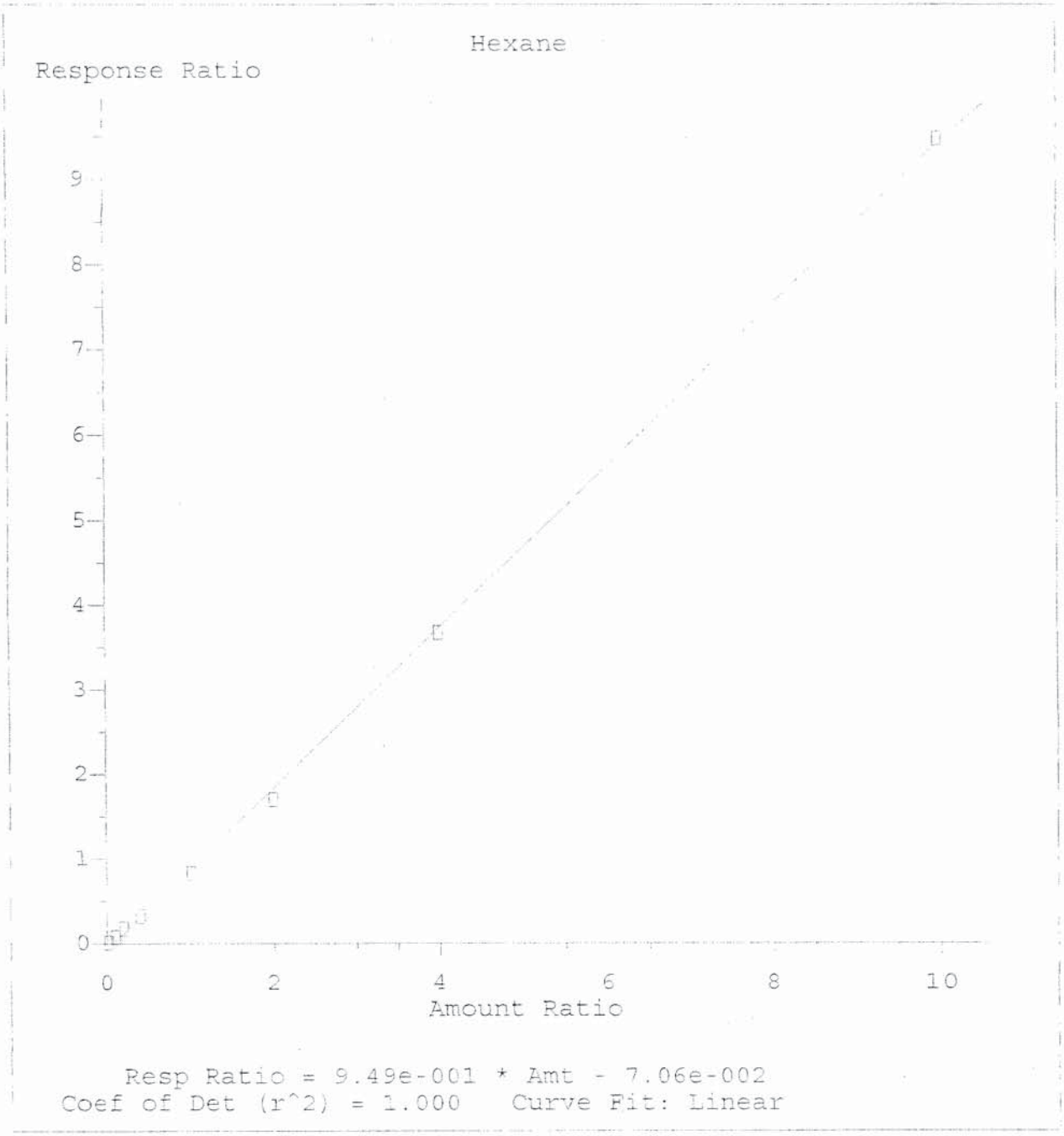
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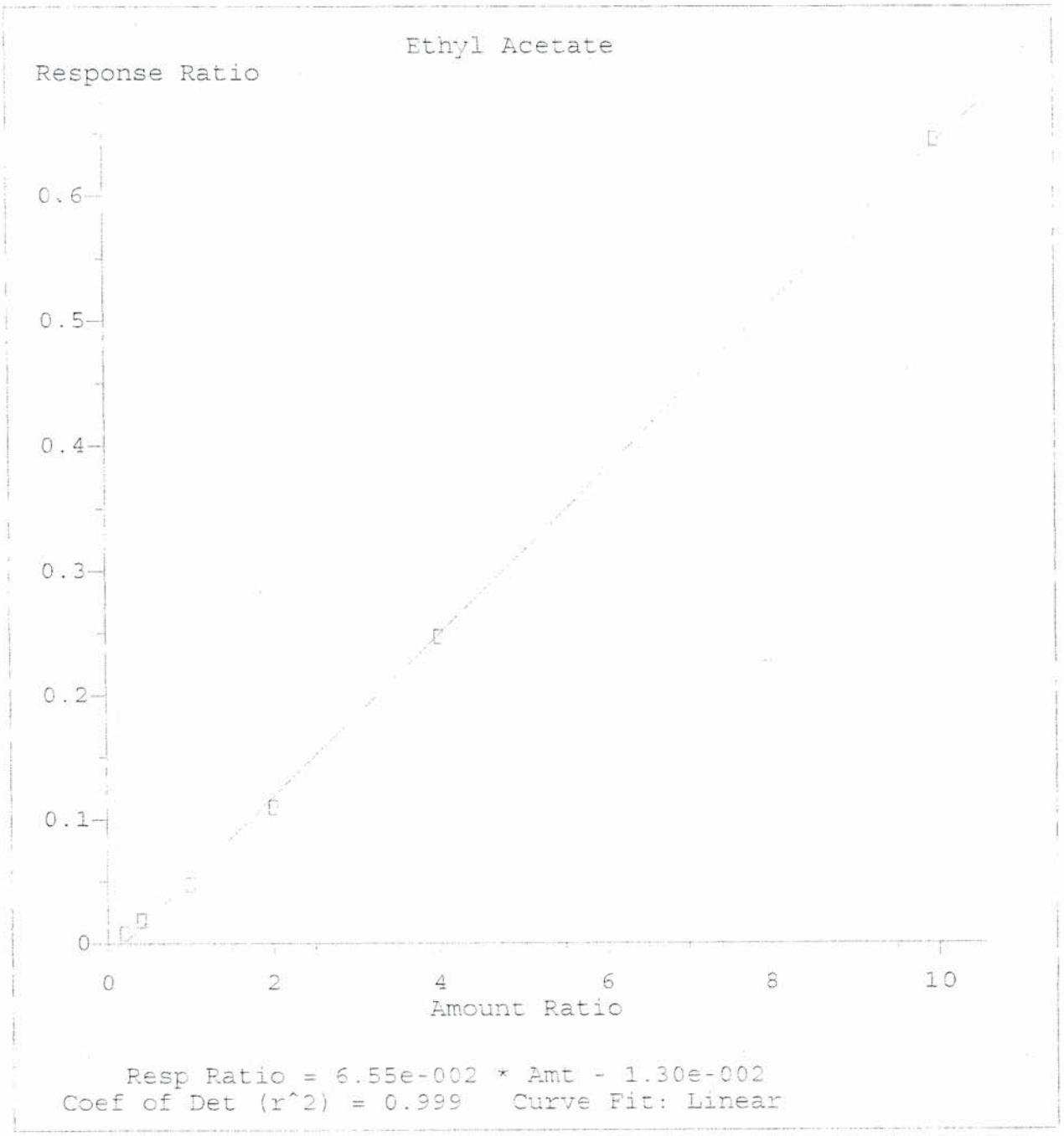
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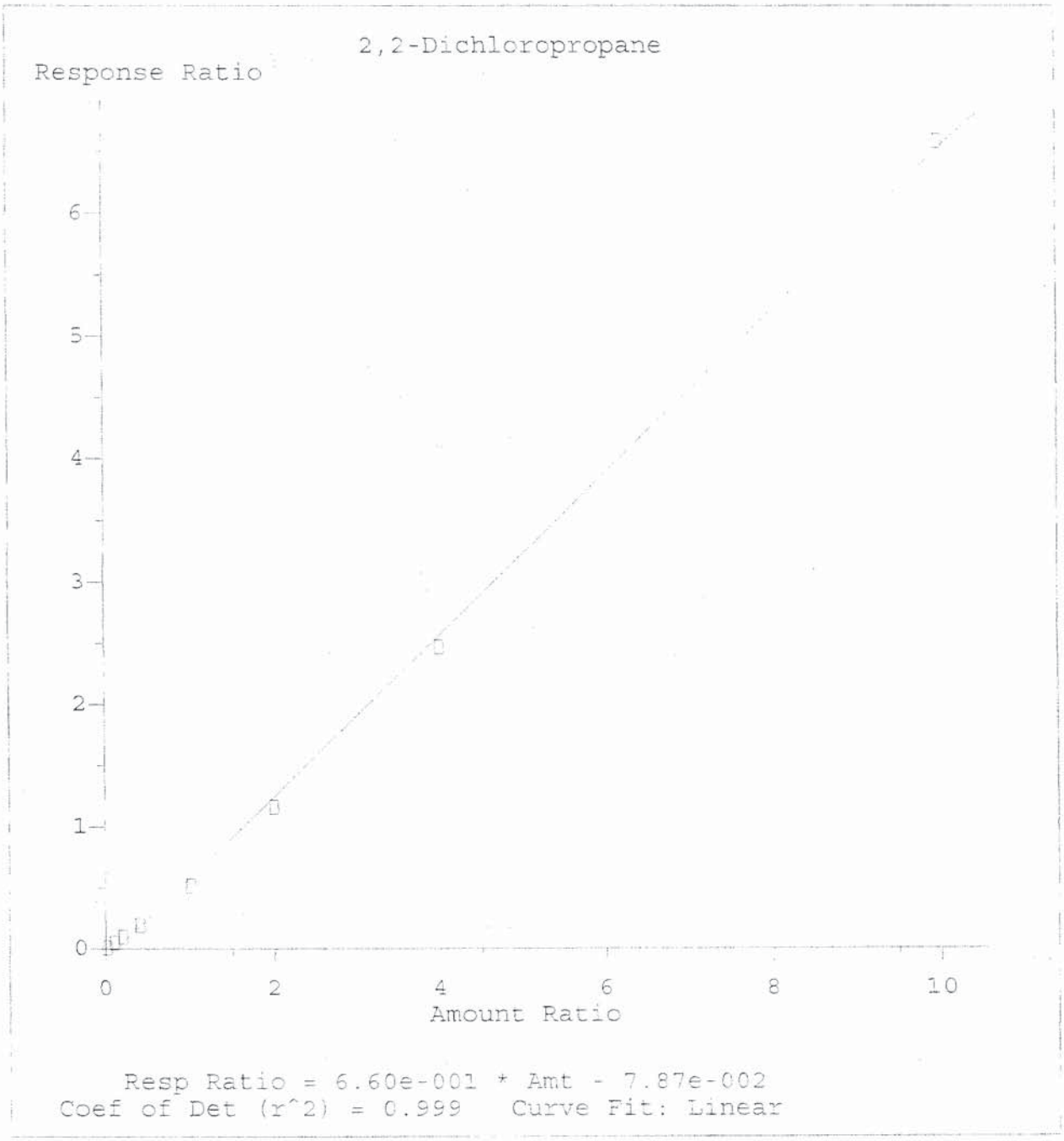
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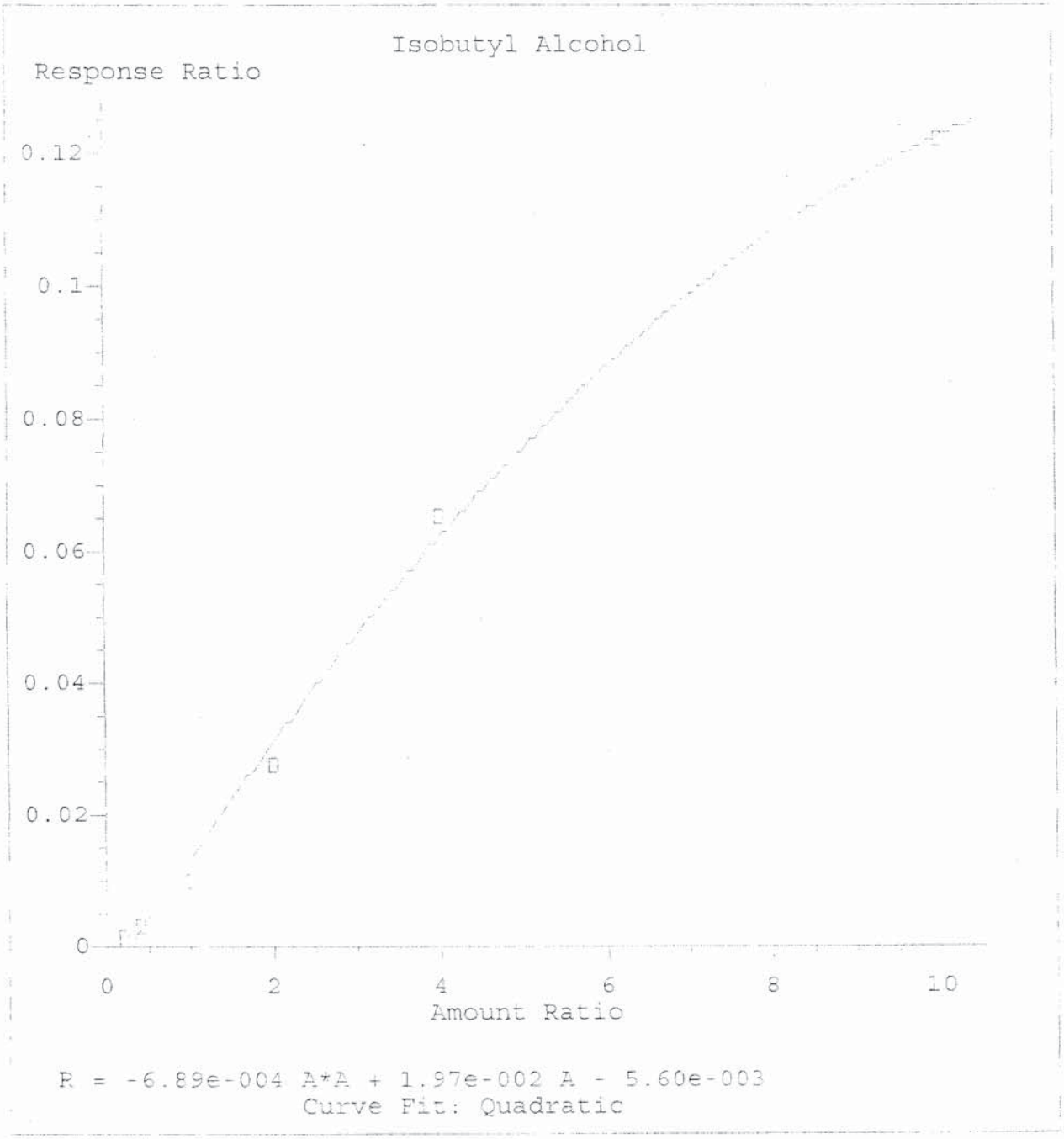
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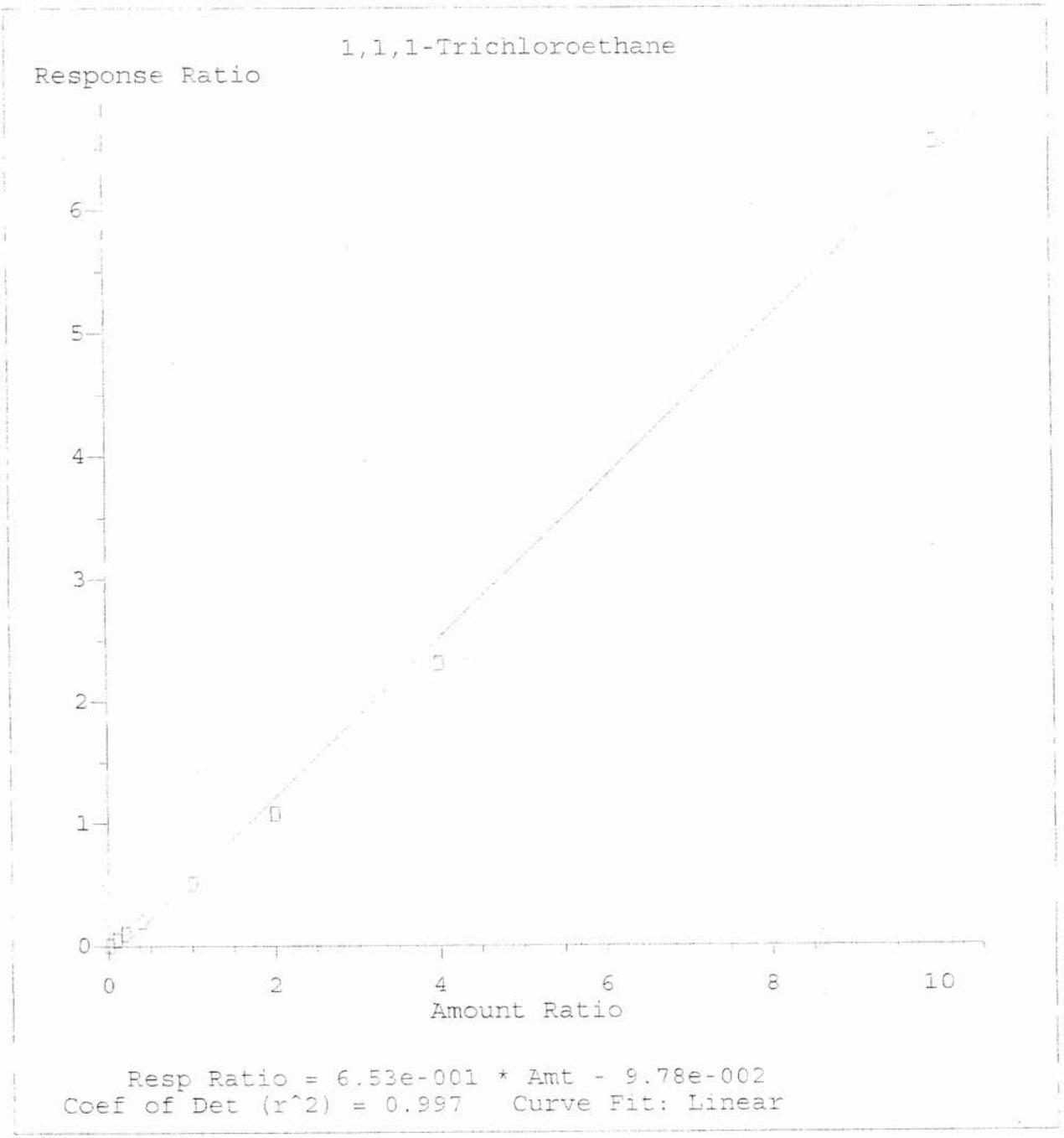
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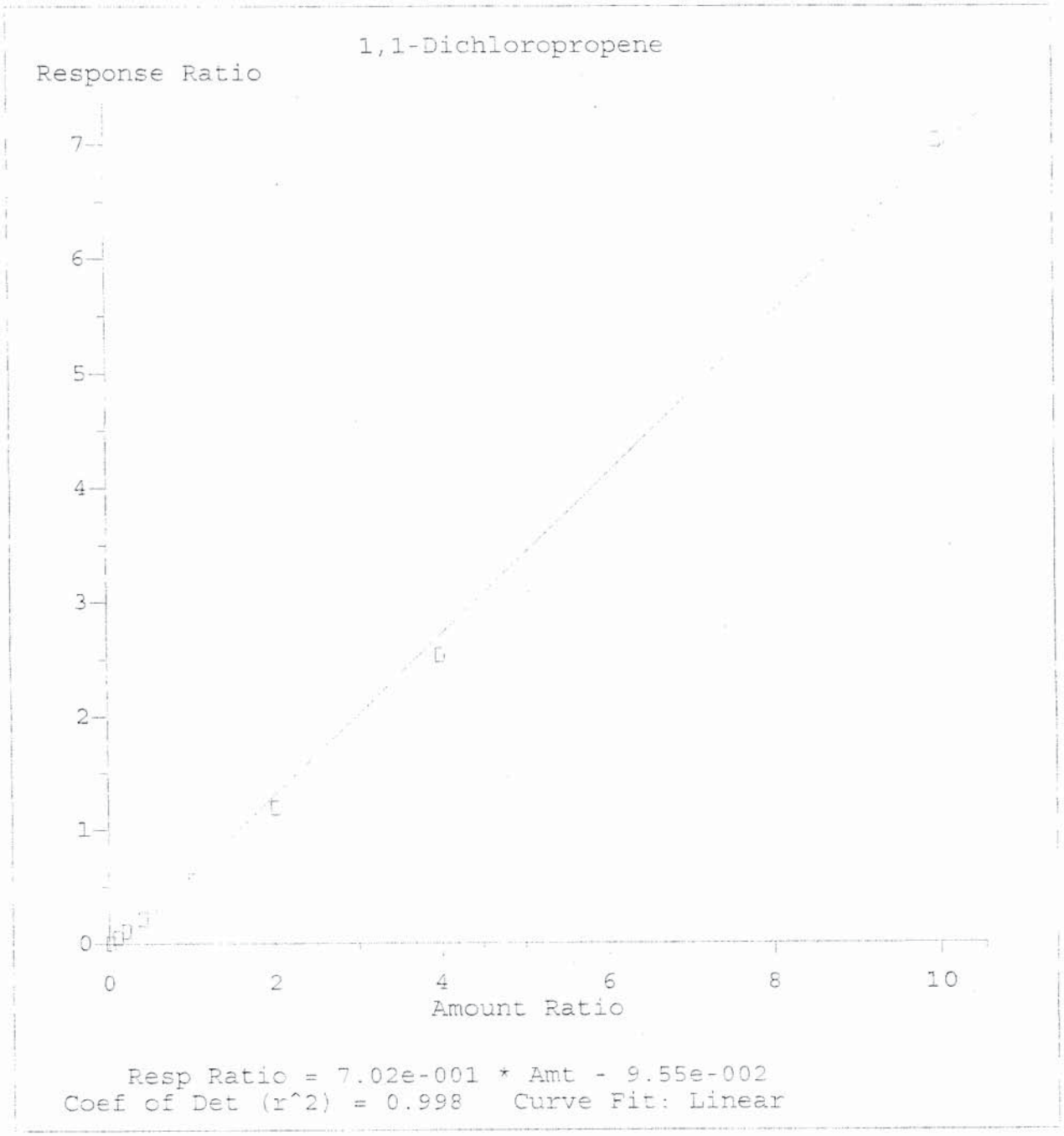
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Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



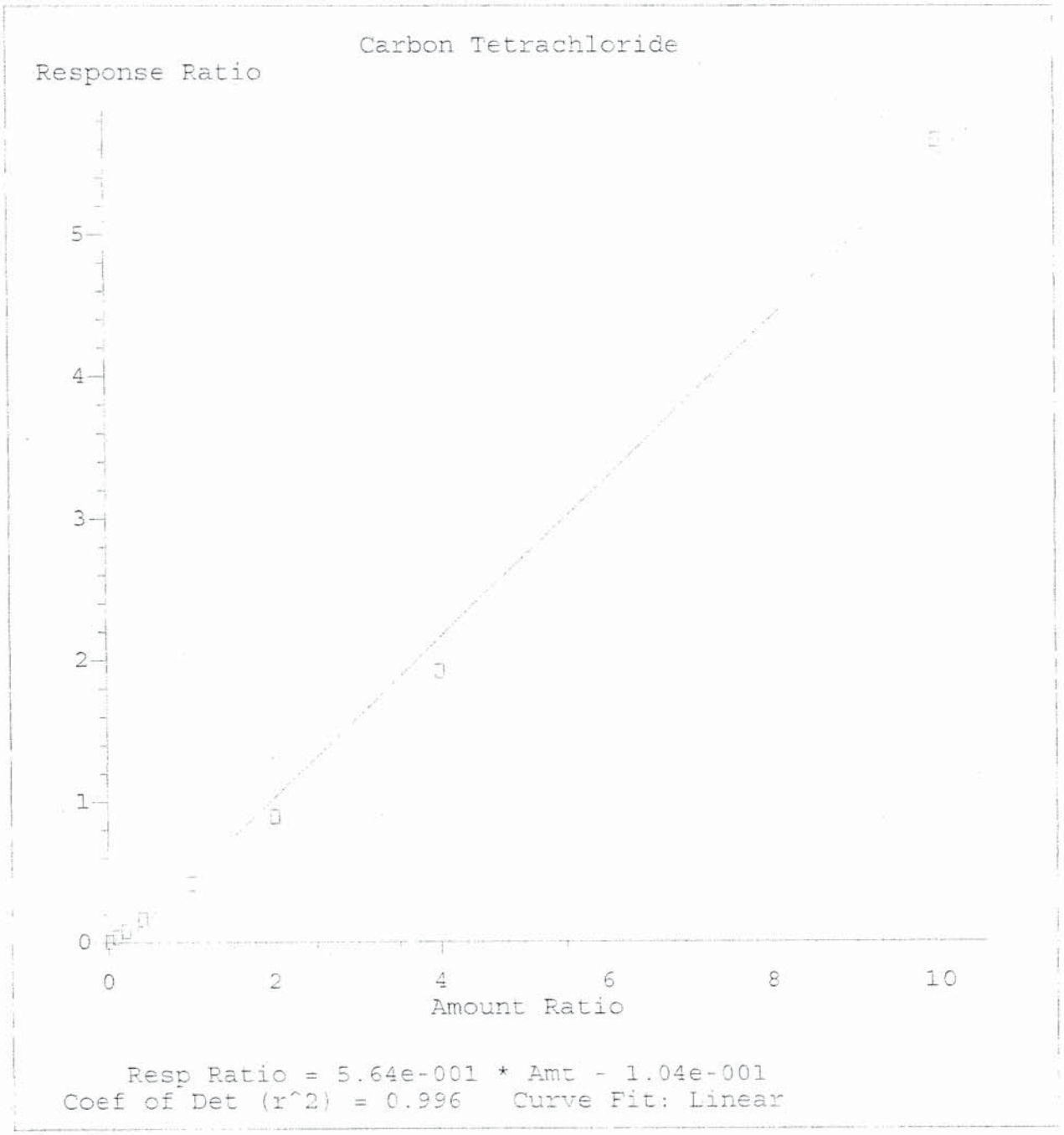
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Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



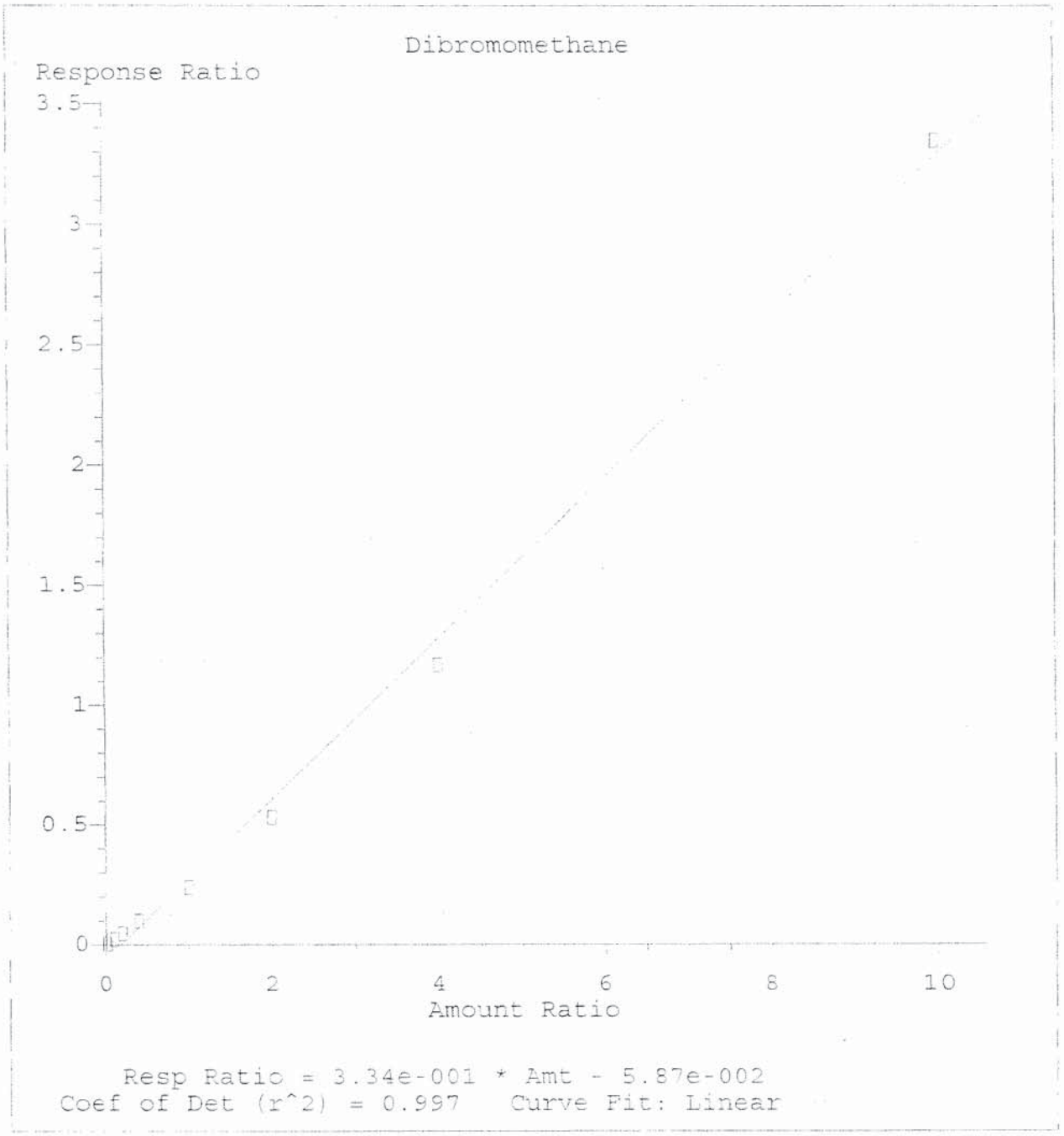
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Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



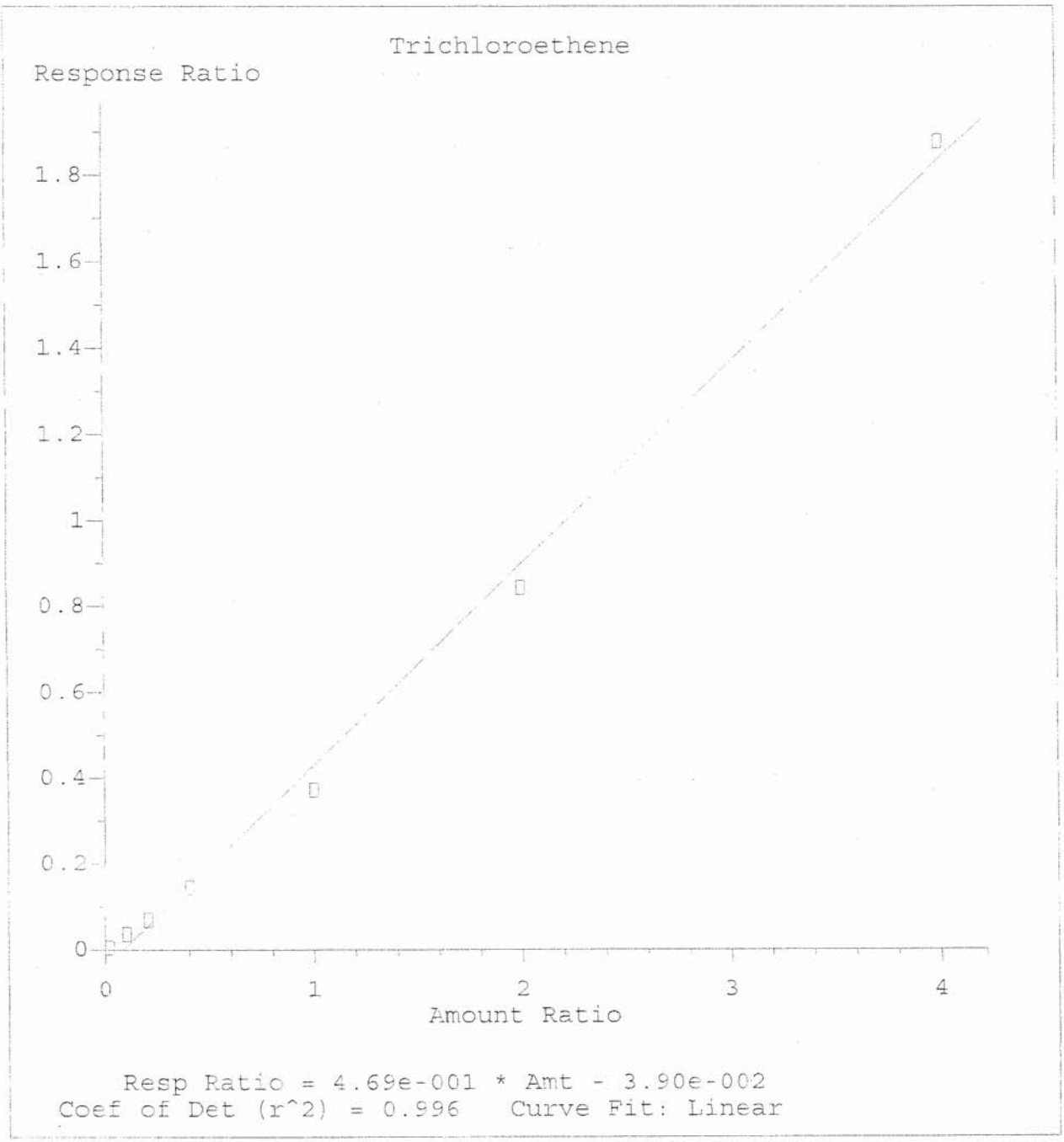
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Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



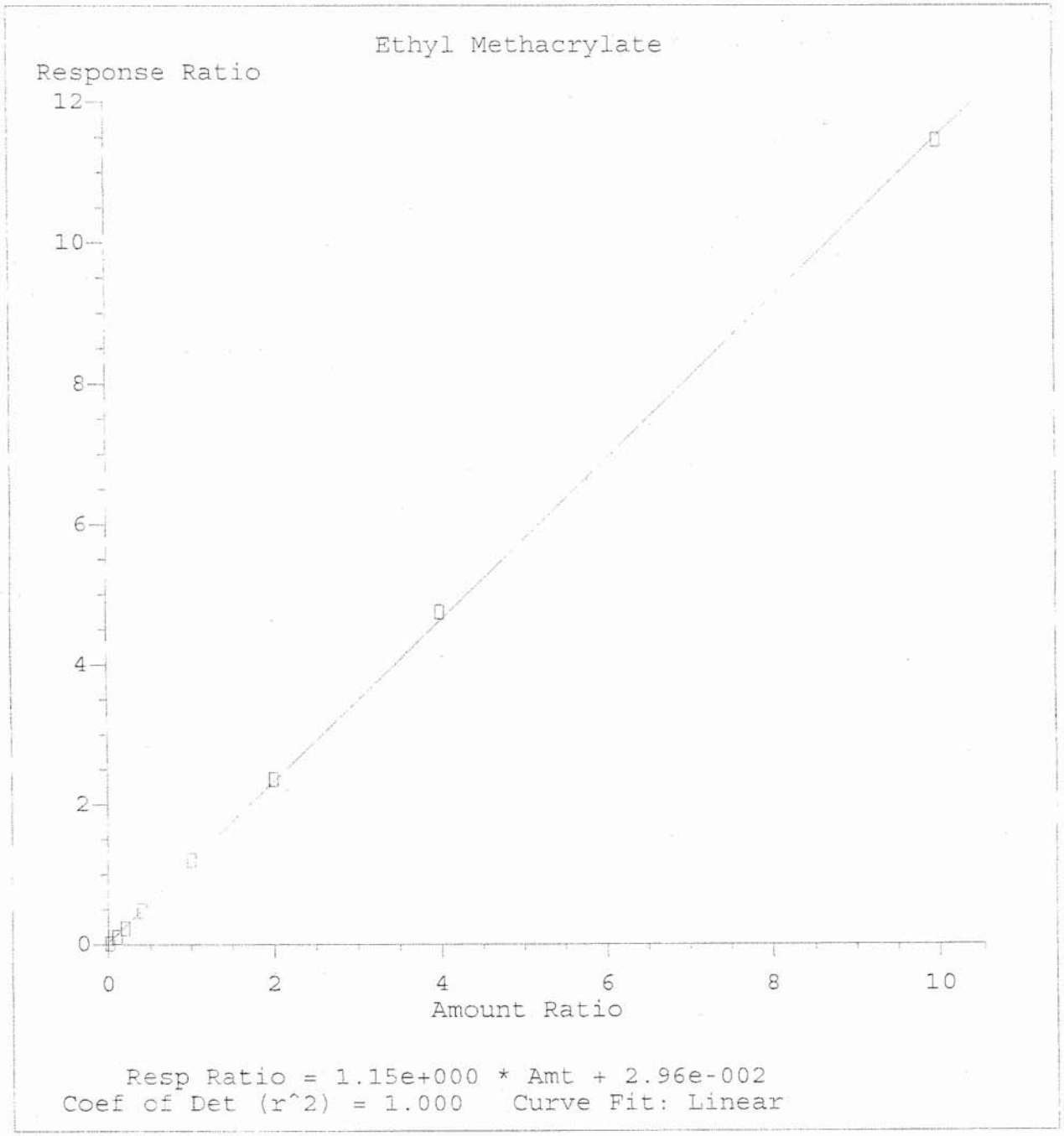
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Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



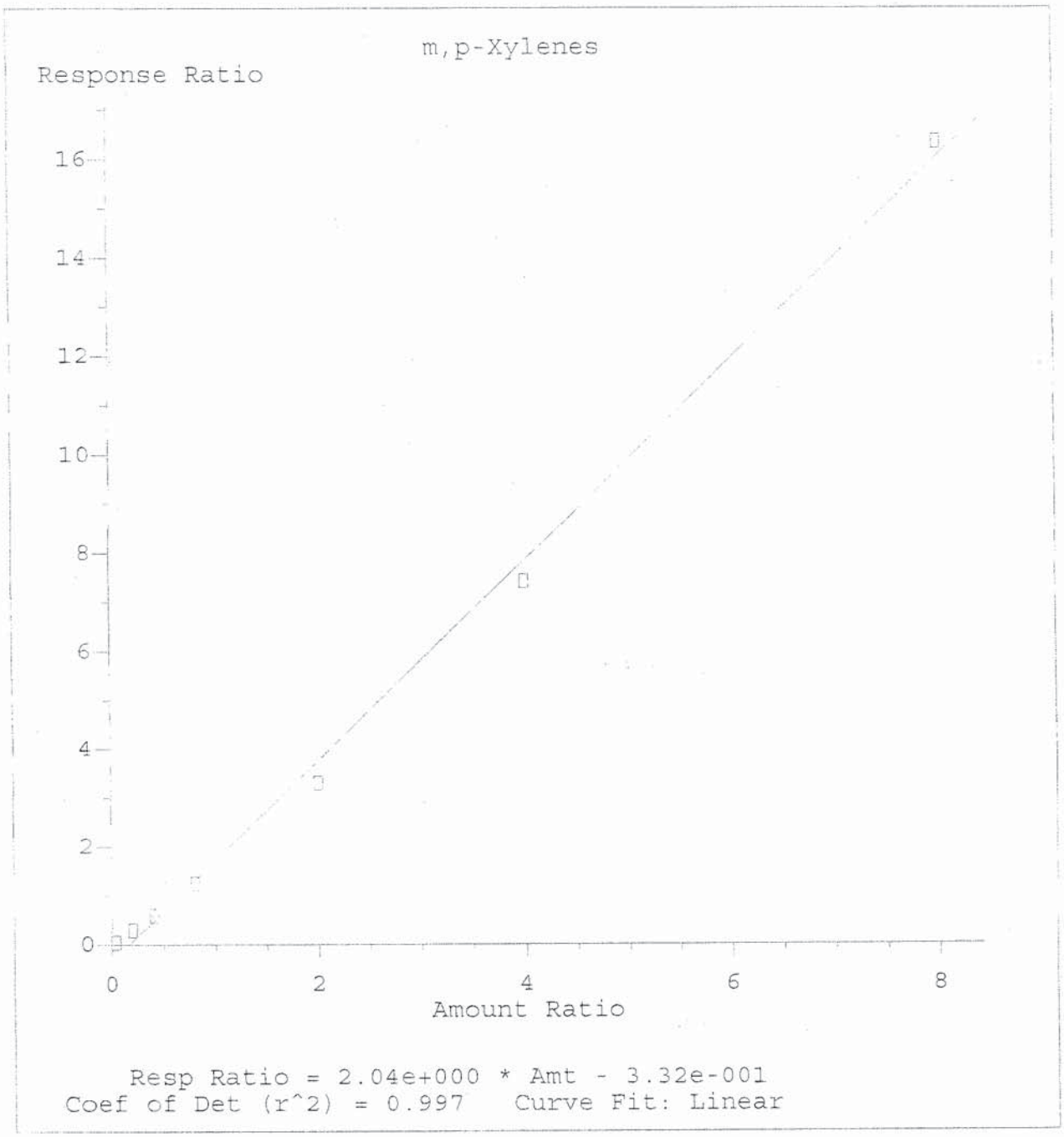
Method Name: C:\HPCHEM\1\METHODS\141130W.M
Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



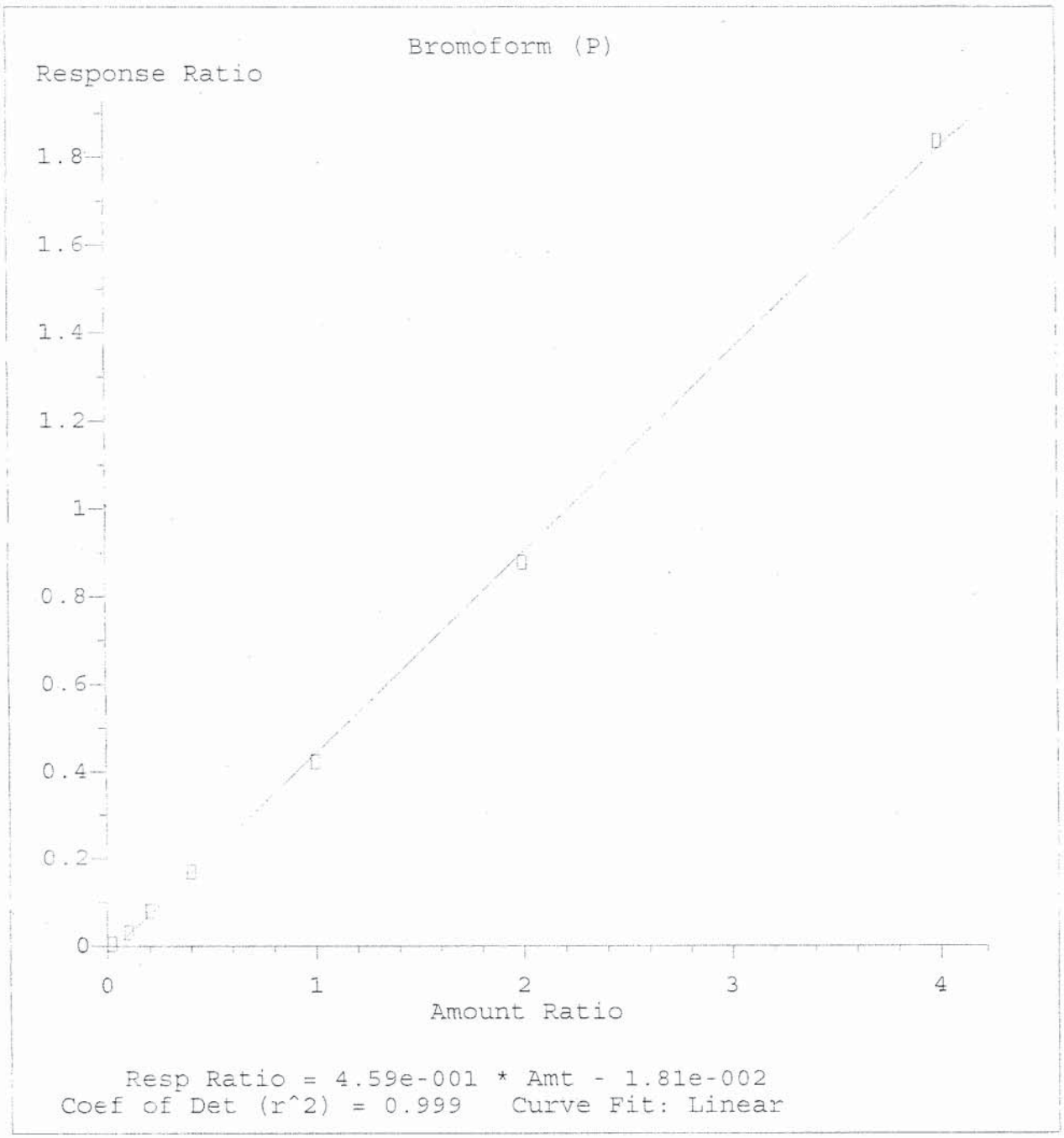
Method Name: C:\HPCHEM\1\METHODS\141130W.M
Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



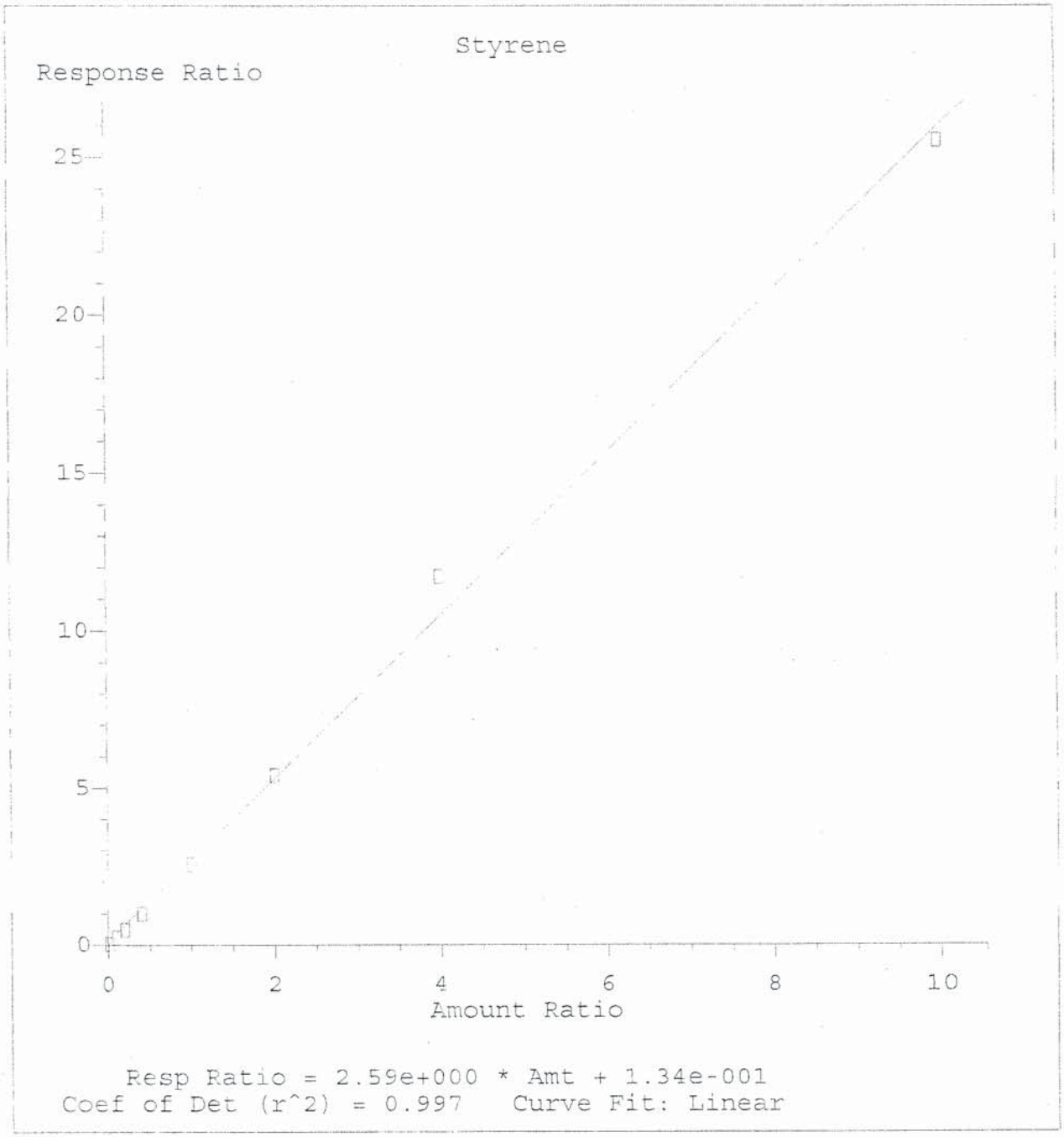
Method Name: C:\HPCHEM\1\METHODS\141130W.M
Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



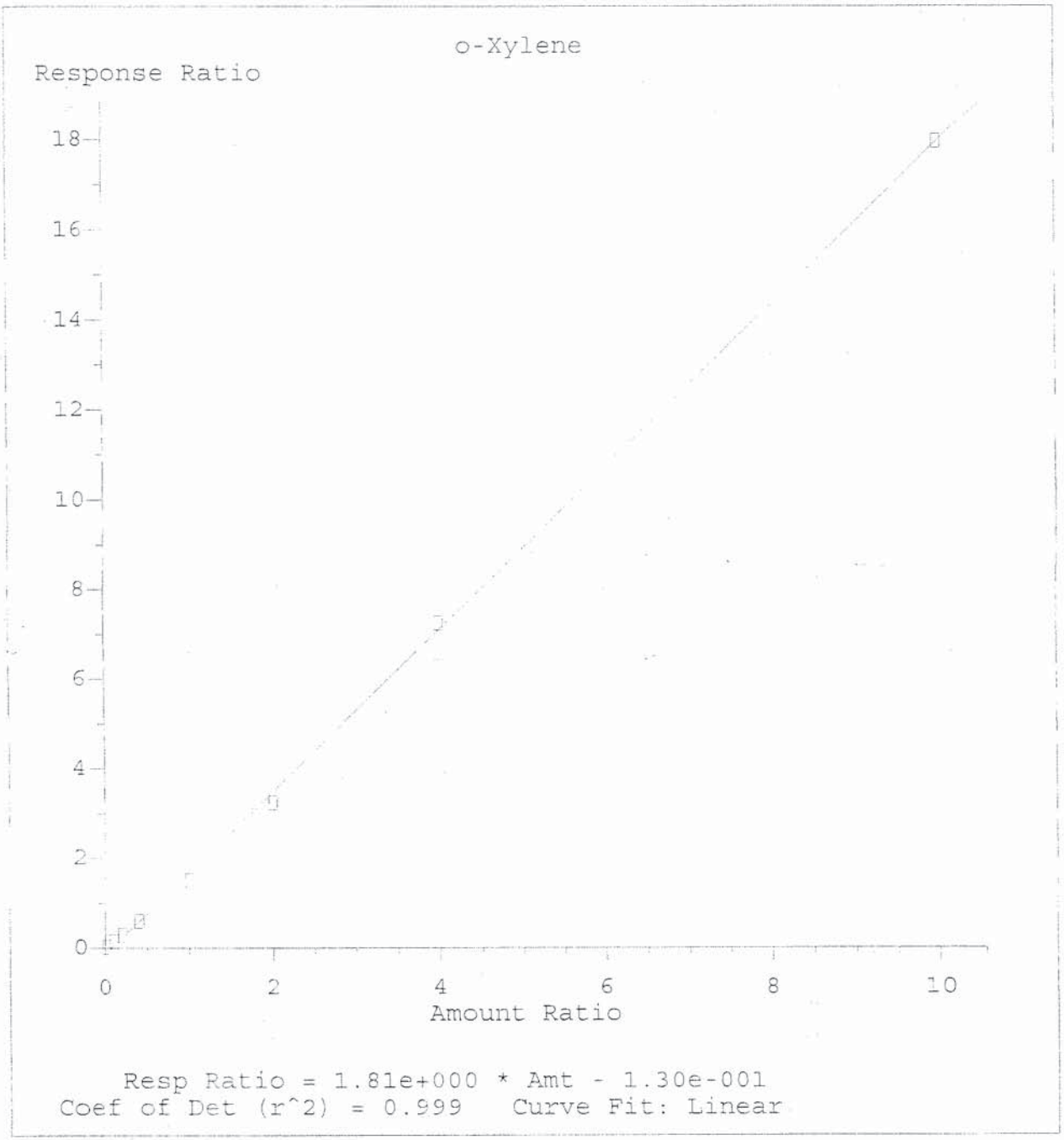
Method Name: C:\HPCHEM\1\METHODS\141130W.M
Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



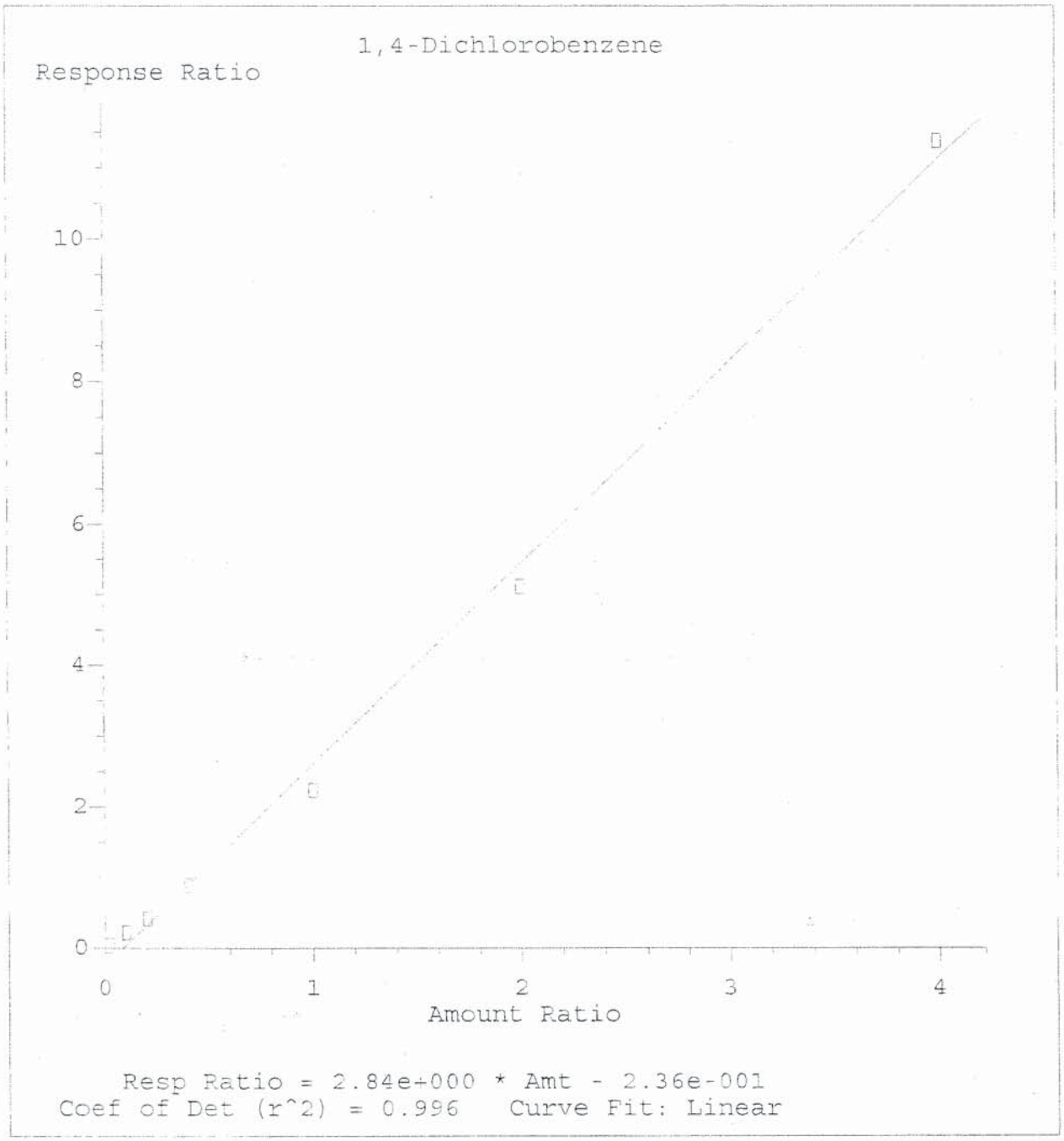
Method Name: C:\HPCHEM\1\METHODS\141130W.M
Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



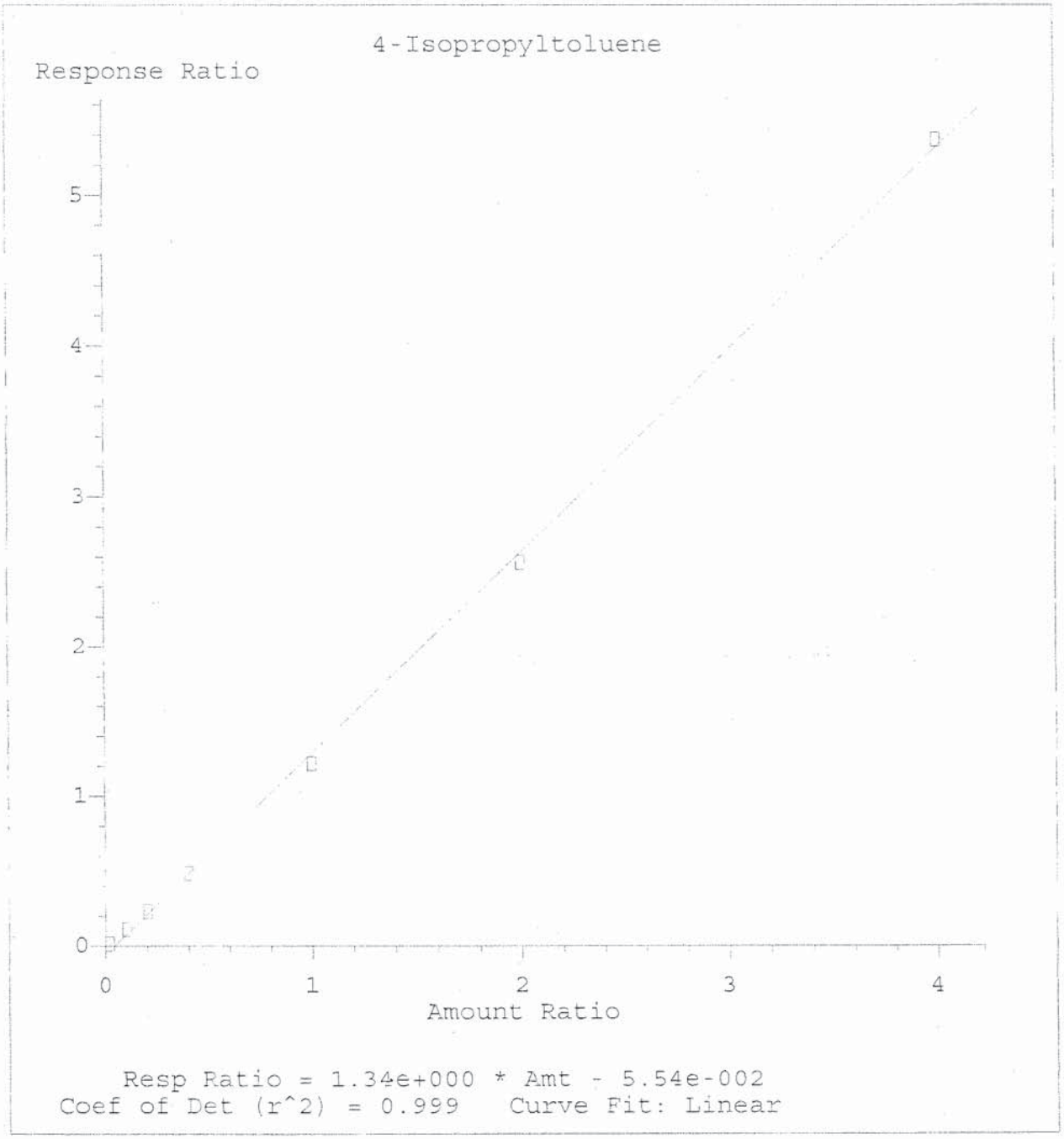
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Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



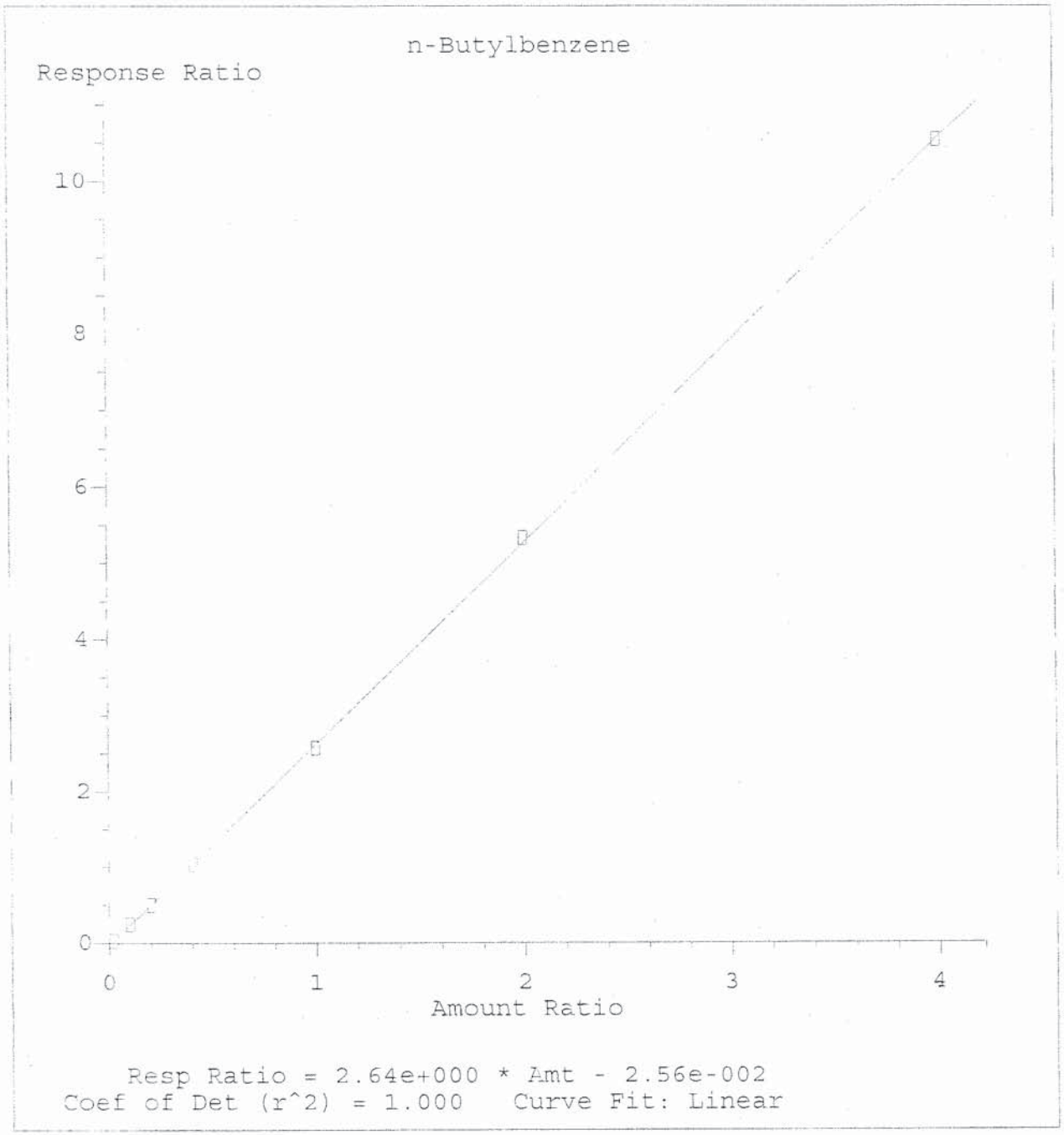
Method Name: C:\HPCHEM\1\METHODS\141130W.M
Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



Method Name: C:\HPCHEM\1\METHODS\141130W.M
Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



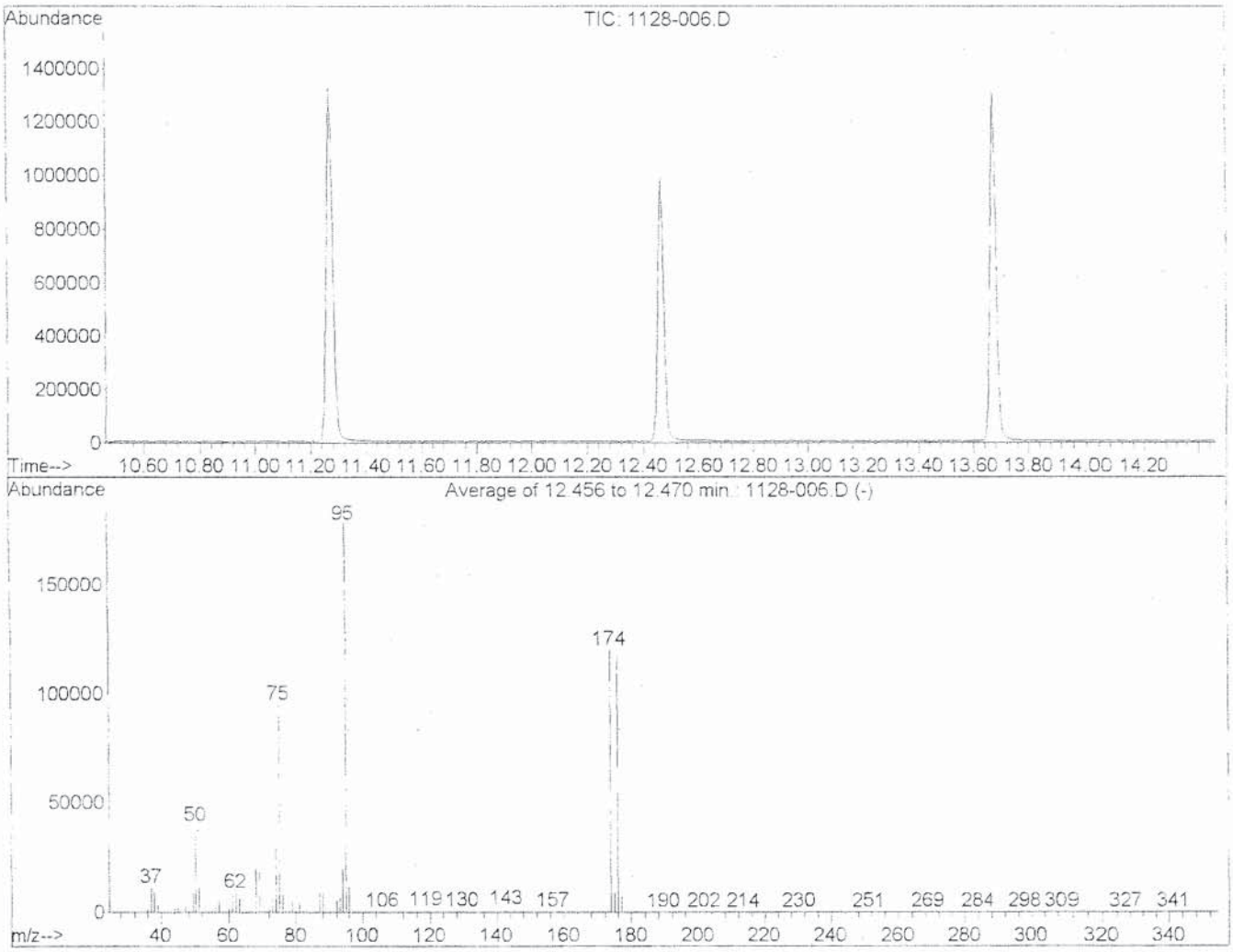
Method Name: C:\HPCHEM\1\METHODS\141130W.M
Calibration Table Last Updated: Wed Dec 31 08:28:40 2014



Method Name: C:\HPCHEM\1\METHODS\141130W.M
Calibration Table Last Updated: Wed Dec 31 08:28:40 2014

BFB

Data File : I:\MS52\DATA\MS52-141128\1128-006.D Vial: 6
Acq On : 28 Nov 2014 4:30 pm Operator: JDB
Sample : TUNE Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260



Spectrum Information: Average of 12.456 to 12.470 min.

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	15	40	22.0	39480	PASS
75	95	30	60	53.1	95040	PASS
95	95	100	100	100.0	179061	PASS
96	95	5	9	6.7	12028	PASS
173	174	0.00	2	0.5	604	PASS
174	95	50	100	66.9	119819	PASS
175	174	5	9	7.6	9057	PASS
176	174	95	101	98.3	117827	PASS
177	176	5	9	6.3	7384	PASS

RJSC 1/6/15

1128-006.D 141130W.M Tue Jan 06 13:21:40 2015

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:45 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Fluorobenzene	8.15	96	869589	50.00	ug/L	0.00
56) Chlorobenzene-d5	11.27	82	407220	50.00	ug/L	0.00
84) 1,4-Dichlorobenzene-d4	13.68	152	299624	50.00	ug/L	0.00
System Monitoring Compounds						
37) Dibromofluoromethane	7.13	111	193140	50.57	ug/L	0.00
Spiked Amount 50.000	Range 86 - 112		Recovery = 101.14%			
41) 1,2-Dichloroethane-d4	7.62	65	257959	44.87	ug/L	0.00
Spiked Amount 50.000	Range 72 - 121		Recovery = 89.74%			
65) Toluene-d8	9.84	98	926553	55.98	ug/L	0.00
Spiked Amount 50.000	Range 88 - 115		Recovery = 111.96%			
87) 4-Bromofluorobenzene	12.46	95	313167	43.11	ug/L	0.00
Spiked Amount 50.000	Range 86 - 113		Recovery = 86.22%			
Target Compounds						Qvalue
2) Dichlorodifluoromethane	2.14	85	6274m	0.77	ug/L	
3) Chloromethane (P)	2.38	50	5646m	0.57	ug/L	
4) Vinyl Chloride (C)	2.54	62	7369m	0.90	ug/L	
5) Bromomethane	3.01	96	842m	8.41	ug/L	
6) Chloroethane	3.16	64	4977m	0.90	ug/L	
7) 1,2-Dichlorotrifluoroethan	3.72	67	6476	0.79	ug/L #	81
8) Acrolein	3.98	56	793m	Below Cal		
9) Acetonitrile	4.15	41	755	Below Cal	#	64
10) Trichlorofluoromethane	3.70	101	6538	0.76	ug/L	95
11) Acetone	4.05	43	3300	1.29	ug/L #	78
12) Diethyl Ether	4.17	59	5494	0.84	ug/L #	73
13) 1,1-Dichloroethene (C)	4.53	61	7943	2.44	ug/L	91
14) tert-Butyl Alcohol	4.69	59	2919m	4.44	ug/L	
15) Iodomethane	4.72	142	1591m	0.64	ug/L	
16) Acrylonitrile	4.91	53	2014	4.72	ug/L #	52
17) Methylene Chloride	4.99	84	7642	1.19	ug/L	94
18) Methyl Acetate	4.86	43	6453m	0.93	ug/L	
19) Allyl Chloride	4.96	41	9713	0.79	ug/L #	95
20) 1,1,2-Trichlorotrifluoroet	4.61	101	4197	5.82	ug/L #	50
21) Carbon Disulfide	5.06	76	16935	0.91	ug/L	96
22) trans-1,2-Dichloroethene	5.65	61	7506m	0.77	ug/L	
23) Methyl tert-Butyl Ether	5.64	73	16188	0.79	ug/L #	89
24) 1,1-Dichloroethane (P)	6.01	63	10585	0.84	ug/L	100
25) Propionitrile	6.29	54	969	11.61	ug/L #	28
26) Vinyl Acetate	6.11	43	10050	0.55	ug/L #	79
27) Chloroprene	6.29	53	7603	0.50	ug/L	98
28) Hexane	6.22	57	8494	0.62	ug/L	96

(#) = qualifier out of range (m) = manual integration

230 JDB 12/16/14

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:45 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
29) 2-Butanone (MEK)	6.49	43	1502	0.39	ug/L	#	64
30) Diisopropyl Ether	6.37	45	22241	0.80	ug/L	#	95
31) Methacrylonitrile	6.63	67	2468	0.79	ug/L	#	74
32) cis-1,2-Dichloroethene	6.72	61	9318	0.96	ug/L		90
34) Bromochloromethane	6.99	130	3334	1.00	ug/L		96
35) Chloroform (C)	6.97	83	8793	0.80	ug/L	#	89
36) 2,2-Dichloropropane	6.82	77	5732	0.61	ug/L	#	82
38) tert-Butyl Ethyl Ether	6.83	59	19827	0.78	ug/L	#	88
39) Isobutyl Alcohol	7.03	43	514	6.42	ug/L	#	22
40) Tetrahydrofuran	7.18	72	1572m	1.74	ug/L		
42) 1,2-Dichloroethane	7.72	62	9051	0.94	ug/L	#	79
43) 1,1,1-Trichloroethane	7.52	97	5102	6.21	ug/L	#	76
44) 1,1-Dichloropropene	7.75	75	6059	5.86	ug/L		98
45) Cyclohexane	7.80	56	10659	0.71	ug/L		92
46) Isopropyl Acetate	7.81	43	11931	0.67	ug/L	#	95
47) Carbon Tetrachloride	7.86	117	4027	7.65	ug/L	#	88
48) Benzene	7.90	78	23322	0.86	ug/L		96
49) tert-Amyl Methyl Ether	8.07	43	6505	0.79	ug/L		94
50) Dibromomethane	8.80	93	3235	9.20	ug/L	#	81
51) 1,2-Dichloropropane (C)	8.69	63	7992	1.00	ug/L	#	91
52) 2-Nitropropane	8.95	43	6415	0.97	ug/L	#	82
53) Trichloroethene	8.65	130	4750	10.39	ug/L		90
54) Bromodichloromethane	8.87	83	8045	0.89	ug/L	#	95
57) Methyl Methacrylate	8.82	69	3824	0.70	ug/L	#	59
58) n-Propyl Acetate	8.84	43	5249	0.46	ug/L	#	94
59) Methyl Cyclohexane	9.03	83	10059	0.78	ug/L		91
60) 2-Chloroethyl Vinyl Ether	9.23	63	3609	0.75	ug/L		94
61) cis-1,3-Dichloropropene	9.44	75	9109	0.85	ug/L	#	73
62) 4-Methyl-2-pentanone (MIBK	9.36	43	5571	0.75	ug/L	#	89
63) trans-1,3-Dichloropropene	9.91	75	8202	0.79	ug/L		98
64) 1,1,2-Trichloroethane	10.06	83	5681	1.13	ug/L		87
66) Toluene (C)	9.91	92	14164	0.90	ug/L		94
67) 1,3-Dichloropropane	10.27	76	10602	1.02	ug/L	#	89
68) Ethyl Methacrylate	10.09	69	5357	0.56	ug/L	#	73
69) 2-Hexanone	10.25	43	1165	0.23	ug/L	#	84
70) Dibromochloromethane	10.54	129	4902	0.89	ug/L	#	86
71) 1,2-Dibromoethane (EDB)	10.75	107	5371	1.05	ug/L	#	97
72) Tetrachloroethene	10.65	164	3598	8.26	ug/L	#	79
73) 1,1,1,2-Tetrachloroethane	11.34	131	4013	0.81	ug/L	#	74
74) 1-Chlorohexane	11.27	91	9346	0.92	ug/L	#	42
75) Chlorobenzene (P)	11.31	112	14670	0.95	ug/L		96

(#) = qualifier out of range (m) = manual integration

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:45 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

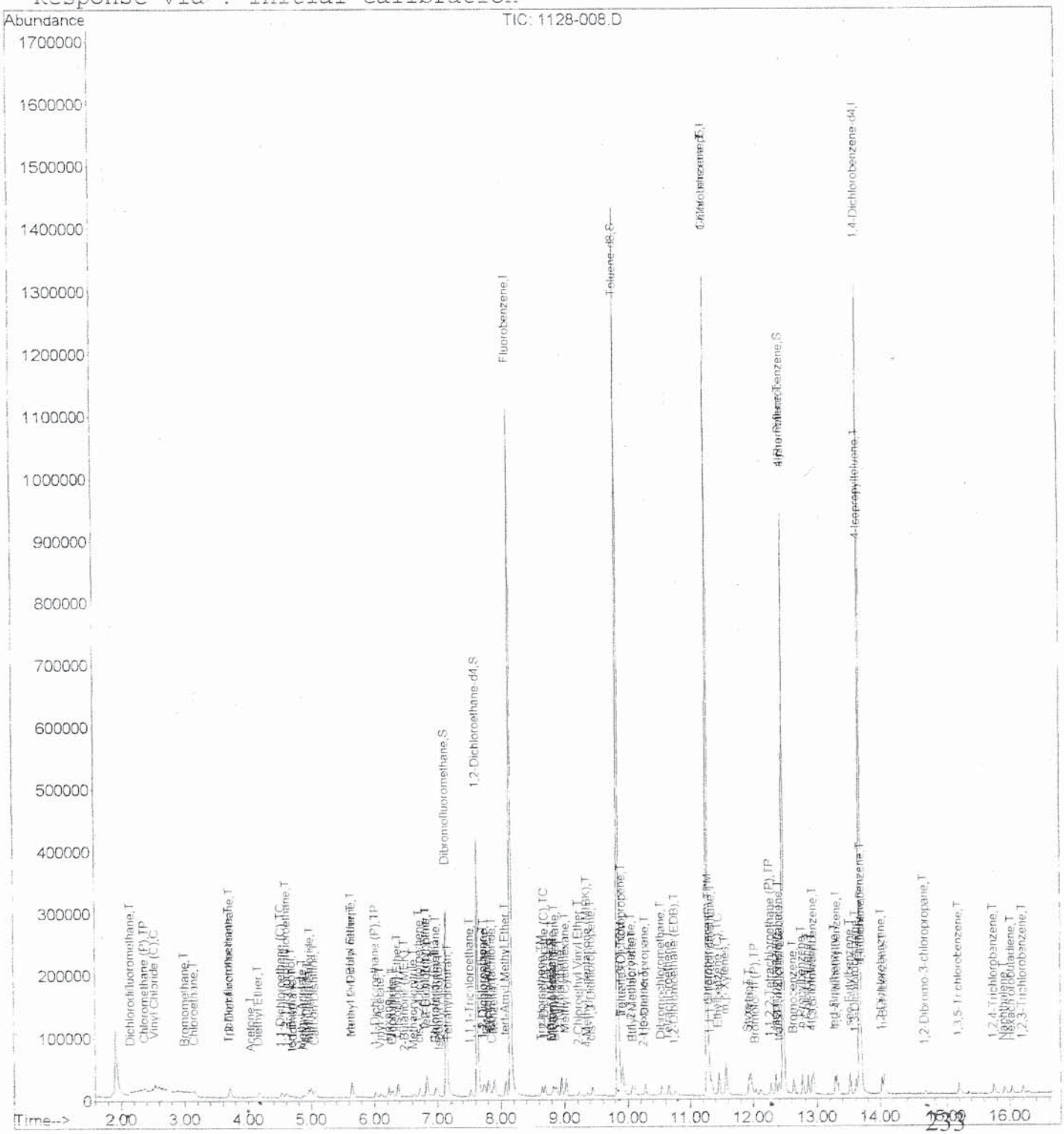
	Compound	R.T.	QIon	Response	Conc Unit		Qvalue
76)	Ethylbenzene (C)	11.45	106	6968	0.77 ug/L	#	96
77)	m,p-Xylenes	11.57	106	17707	7.88 ug/L		95
78)	Bromoform (P)	12.04	173	1774	0.55 ug/L	#	64
79)	Cyclohexanone	12.14	55	607	Below Cal	#	98
80)	Styrene	11.93	104	12097	0.65 ug/L	#	81
81)	1,1,2,2-Tetrachloroethane	12.27	83	7729	1.05 ug/L		95
82)	o-Xylene	11.96	106	8155	5.36 ug/L	#	86
83)	1,2,3-Trichloropropane	12.40	110	2398	1.20 ug/L		85
85)	trans-1,4-Dichloro-2-buten	12.42	53	2711	1.01 ug/L	#	27
86)	Isopropylbenzene	12.35	120	6253	0.83 ug/L	#	65
88)	alpha-Pinene	12.47	93	24244	1.35 ug/L	#	87
89)	Bromobenzene	12.63	77	11486	0.88 ug/L		92
90)	n-Propylbenzene	12.76	120	5427	0.68 ug/L		94
91)	2-Chlorotoluene	12.85	126	4273m	0.72 ug/L		
92)	4-Chlorotoluene	12.92	126	4657	0.70 ug/L	#	67
93)	1,3,5-Trimethylbenzene	12.94	120	7740	0.65 ug/L		88
94)	tert-Butylbenzene	13.28	91	12380	0.67 ug/L		93
95)	1,2,4-Trimethylbenzene	13.32	120	9521	0.71 ug/L	#	69
96)	sec-Butylbenzene	13.51	134	4079	0.66 ug/L		90
97)	1,3-Dichlorobenzene	13.61	146	9502	0.79 ug/L		93
98)	d-Limonene	13.71	68	8183	0.61 ug/L	#	79
99)	1,4-Dichlorobenzene	13.71	146	10263	0.80 ug/L	#	86
100)	4-Isopropyltoluene	13.66	134	3918	0.55 ug/L	#	58
101)	1,2-Dichlorobenzene	14.03	146	9892	0.87 ug/L		86
102)	n-Butylbenzene	14.06	92	9177	0.60 ug/L		92
103)	1,2-Dibromo-3-chloropropan	14.68	157	986	0.81 ug/L	#	84
104)	1,3,5-Trichlorobenzene	15.20	180	7032	0.96 ug/L	#	82
105)	1,2,4-Trichlorobenzene	15.77	180	4935	0.87 ug/L		89
106)	Naphthalene	15.92	128	9272	0.75 ug/L		96
107)	Hexachlorobutadiene	16.03	225	2057	0.69 ug/L	#	87
108)	1,2,3-Trichlorobenzene	16.21	180	3869	2.57 ug/L	#	85

(#) = qualifier out of range (m) = manual integration
1128-008.D 141118W.M Sun Nov 30 12:45:59 2014

Quantitation Report

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:45 2014 Quant Results File: 141118W.RES

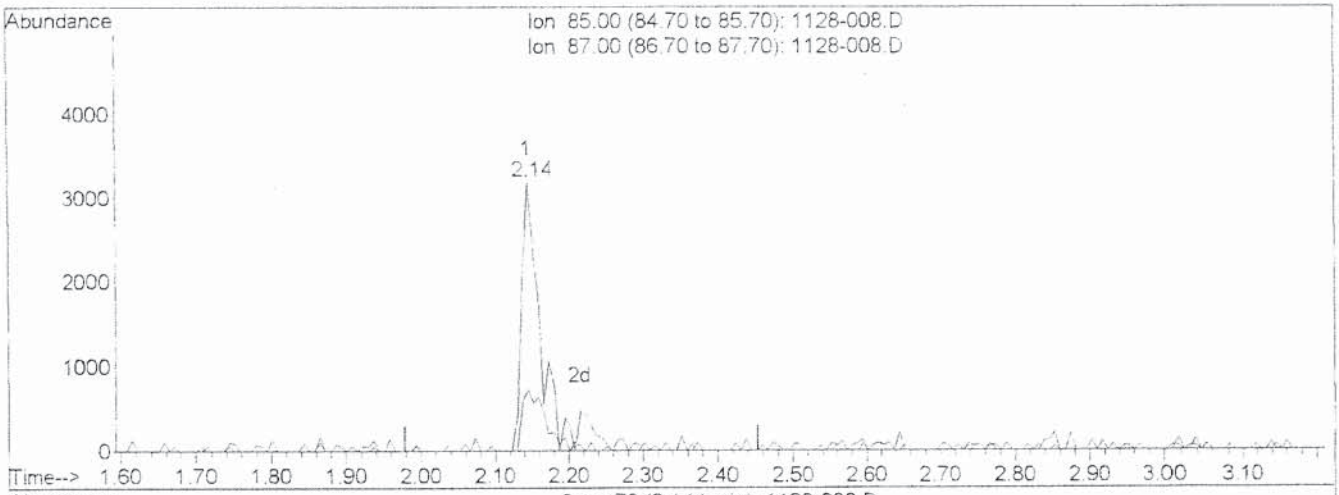
Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration

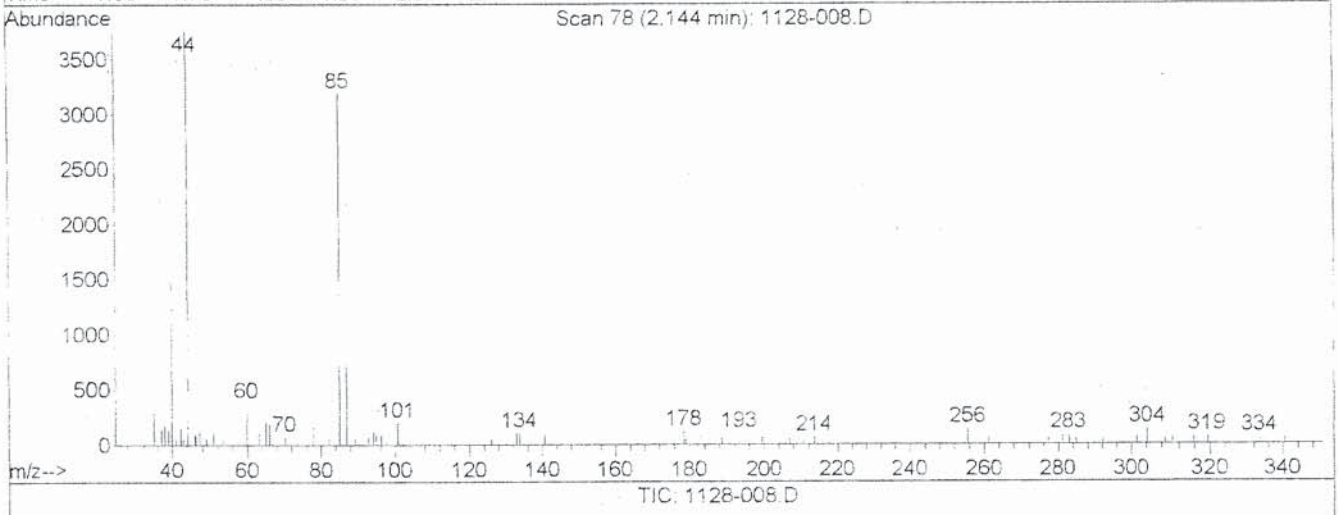


Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:41 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(2) Dichlorodifluoromethane (T)

2.14min 0.69ug/L

response 5575

Ion	Exp%	Act%
85.00	100	100
87.00	32.40	29.58
0.00	0.00	0.00
0.00	0.00	0.00

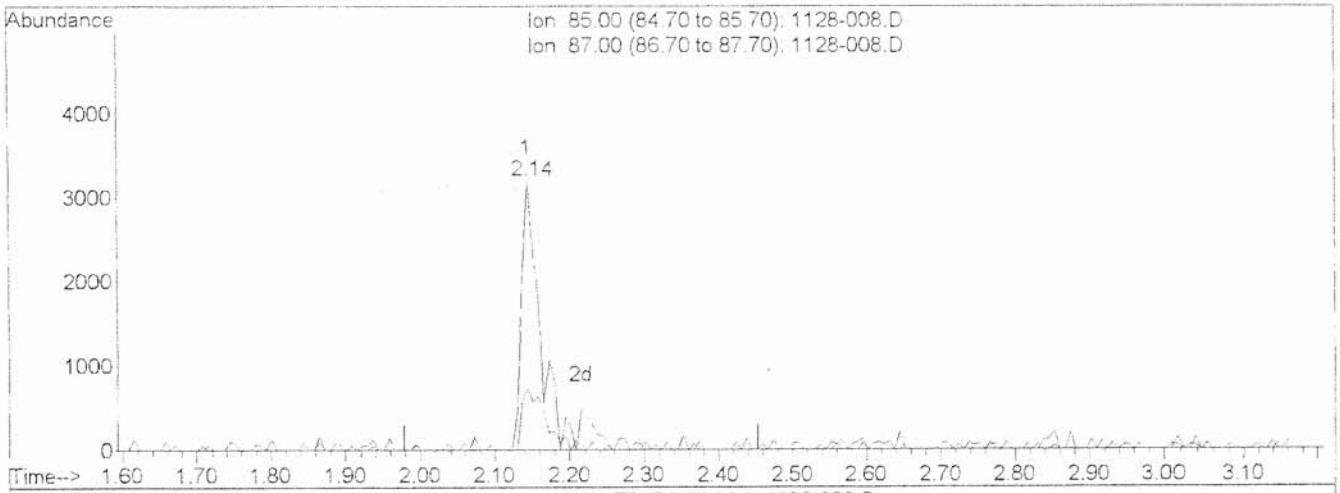
ASa 1/6/15

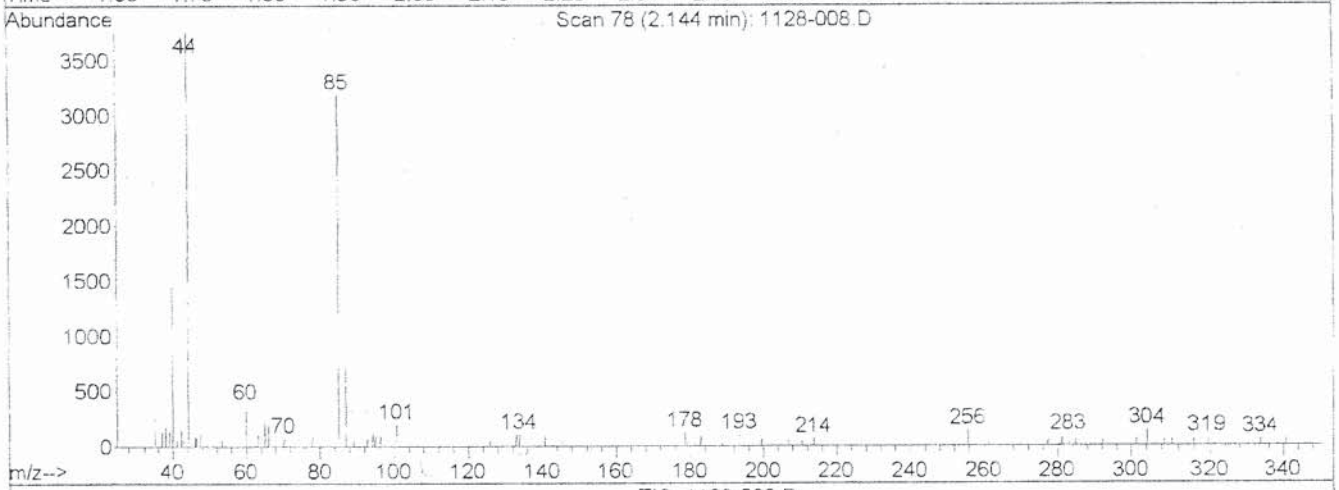
1128-008.D 141118W.M Sun Nov 30 12:42:08 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:42 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(2) Dichlorodifluoromethane (T)

2.14min 0.77ug/L m

response 6274

Ion	Exp%	Act%
85.00	100	100
87.00	32.40	26.28
0.00	0.00	0.00
0.00	0.00	0.00

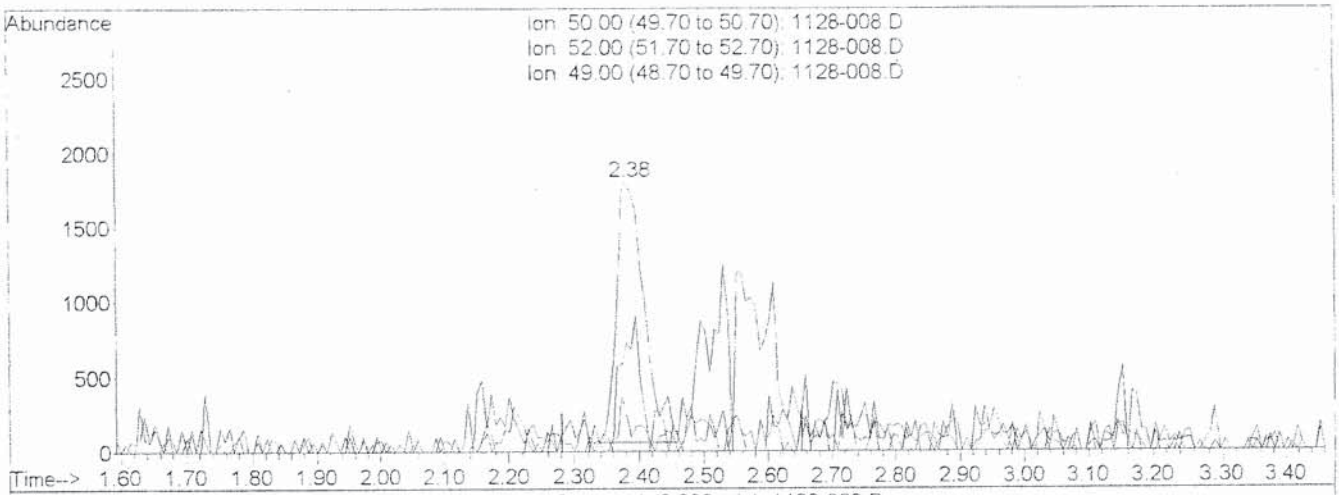
MANUAL EDIT CODES:
1. WRONG PEAK SELECTED
(2) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JDB
DATE 12/2/15

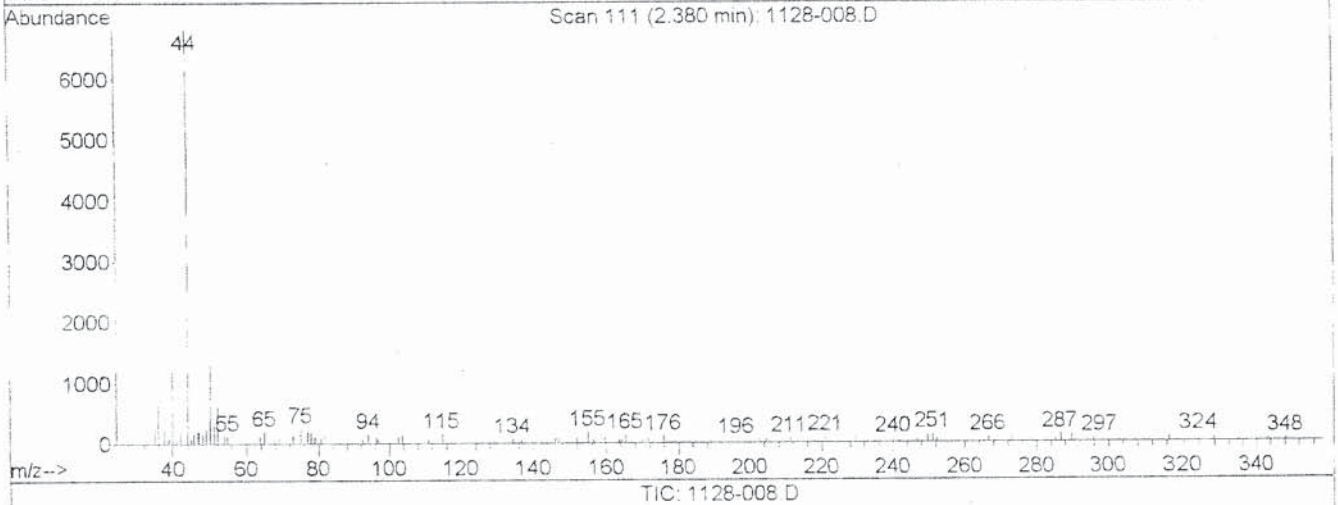
1128-008.D 141118W.M Sun Nov 30 12:42:13 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:42 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(3) Chloromethane (P) (TP)

2.38min 0.52ug/L

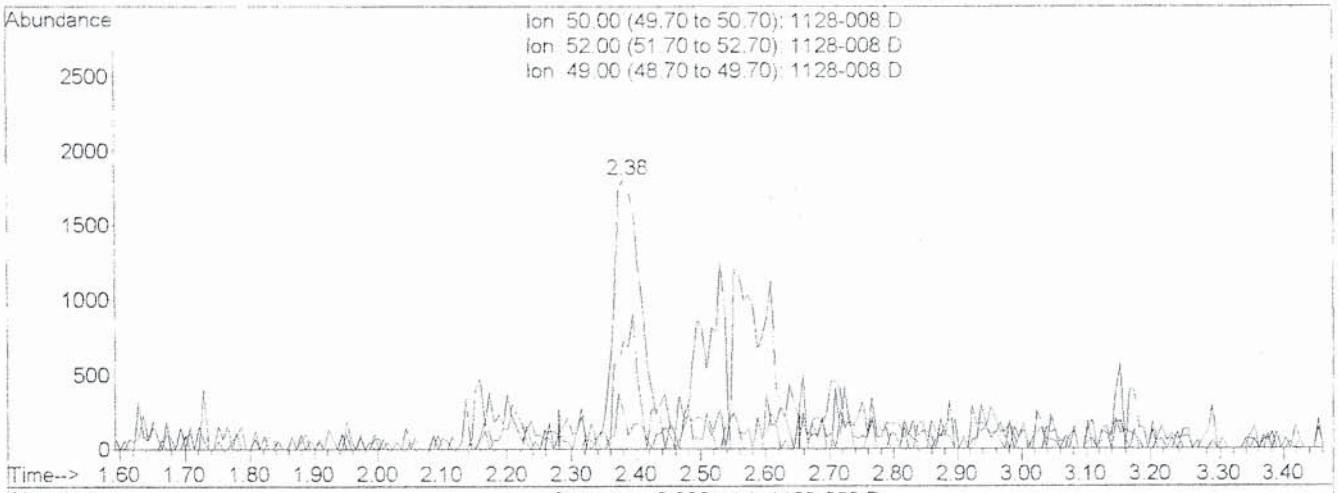
response 5201

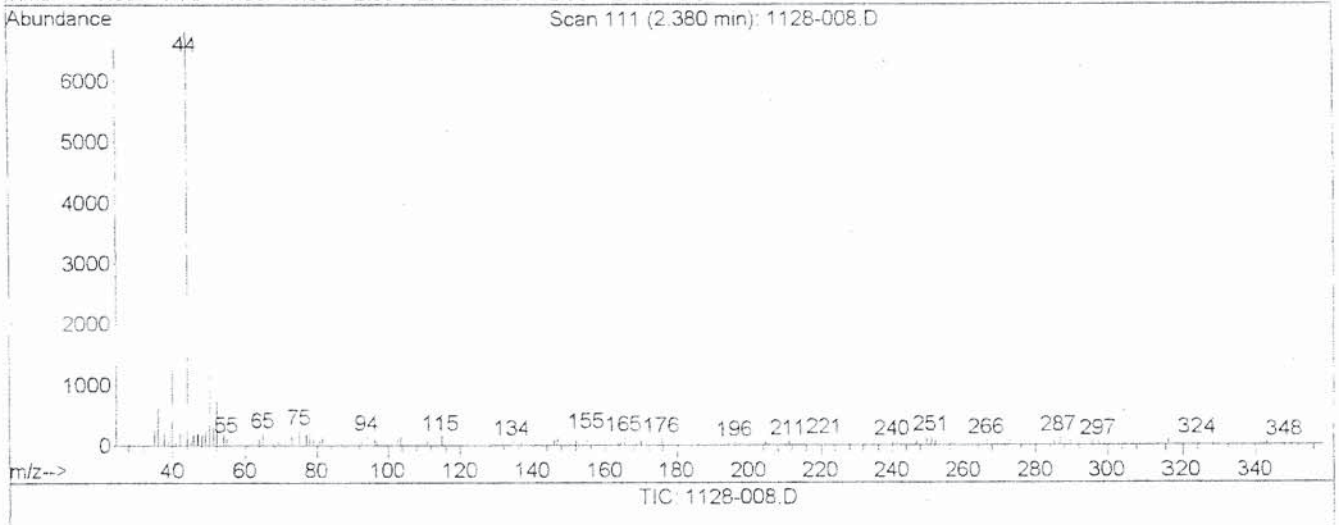
Ion	Exp%	Act%
50.00	100	100
52.00	31.10	37.09
49.00	9.60	0.00#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:42 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(3) Chloromethane (P) (TP)

2.38min 0.57ug/L m

response 5646

Ion	Exp%	Act%
50.00	100	100
52.00	31.10	34.17
49.00	9.60	0.00#
0.00	0.00	0.00

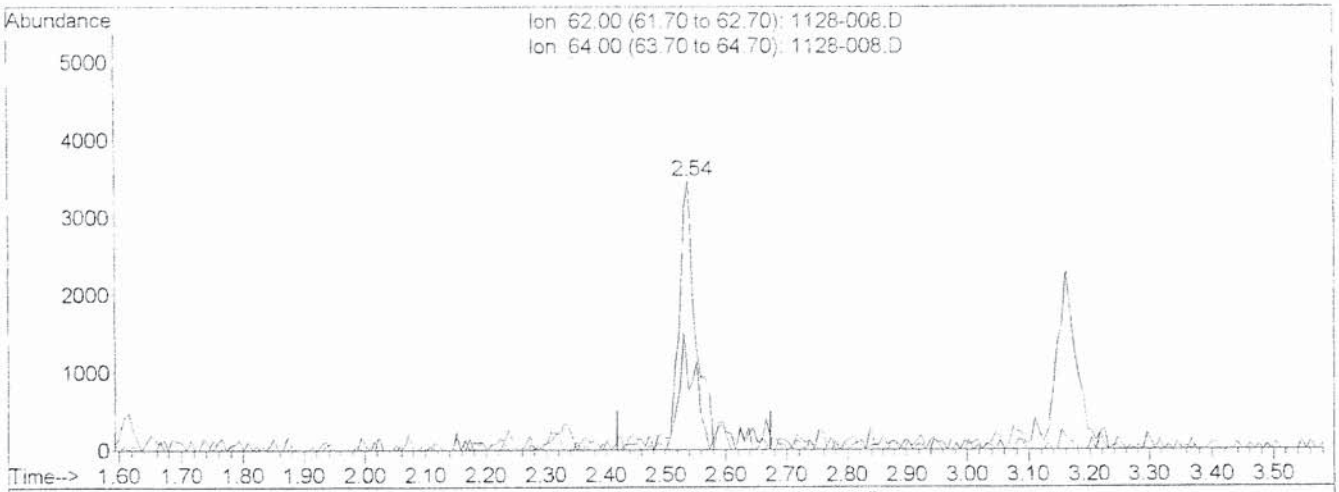
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 1/6/15

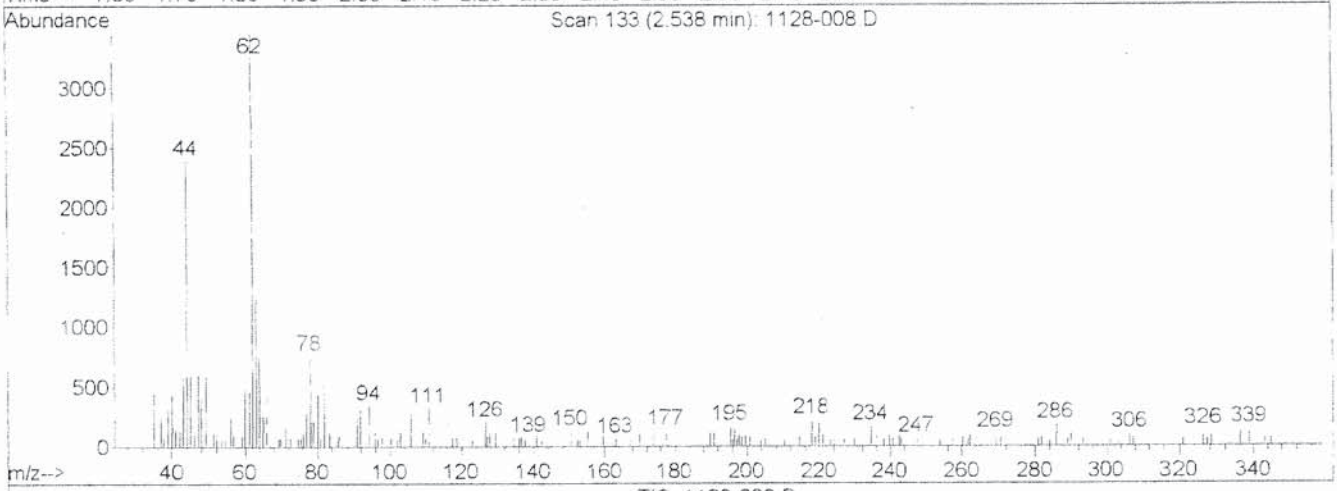
1128-008.D 141118W.M Sun Nov 30 12:42:31 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:42 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(4) Vinyl Chloride (C) (C)

2.54min 0.82ug/L

response 6659

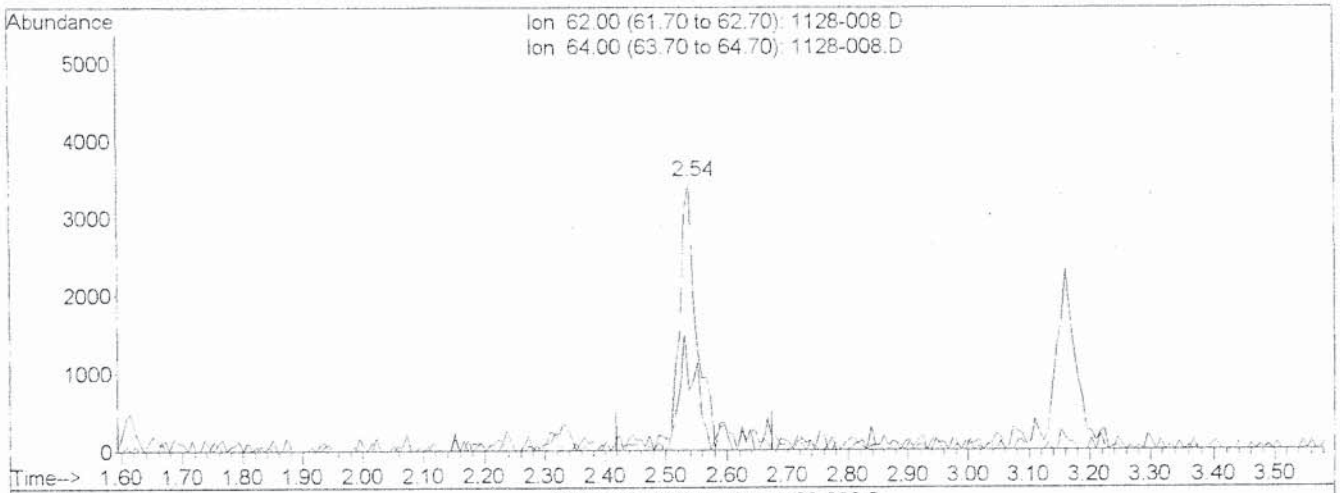
Ion	Exp%	Act%
62.00	100	100
64.00	31.00	45.05#
0.00	0.00	0.00
0.00	0.00	0.00

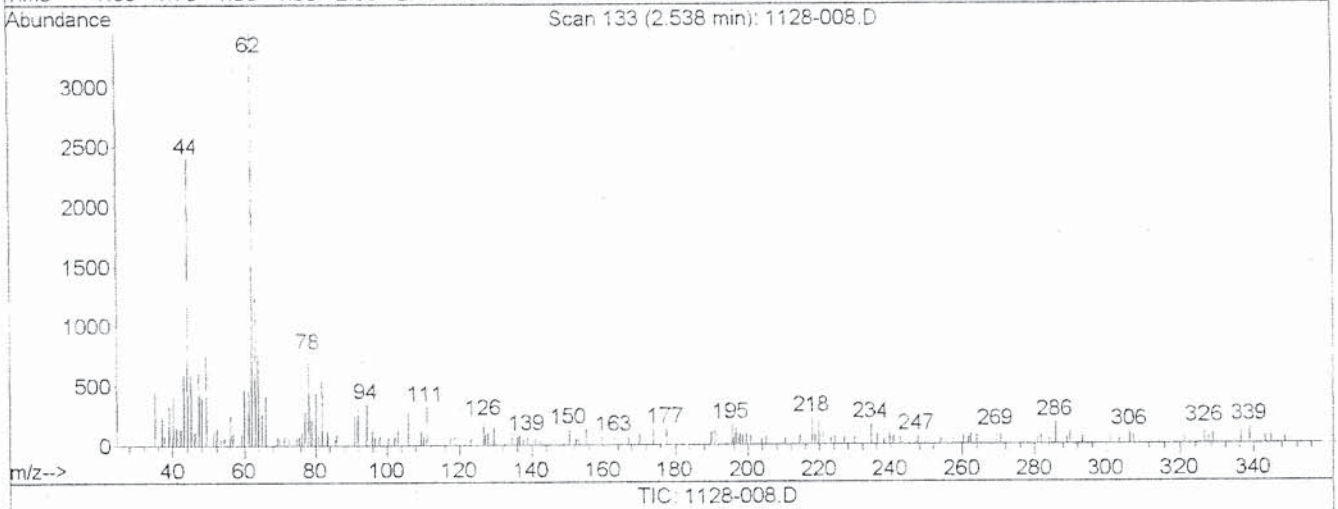
1128-008.D 141118W.M Sun Nov 30 12:42:35 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:42 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(4) Vinyl Chloride (C) (C)

2.54min 0.90ug/L m

response 7369

Ion	Exp%	Act%
62.00	100	100
64.00	31.00	40.71#
0.00	0.00	0.00
0.00	0.00	0.00

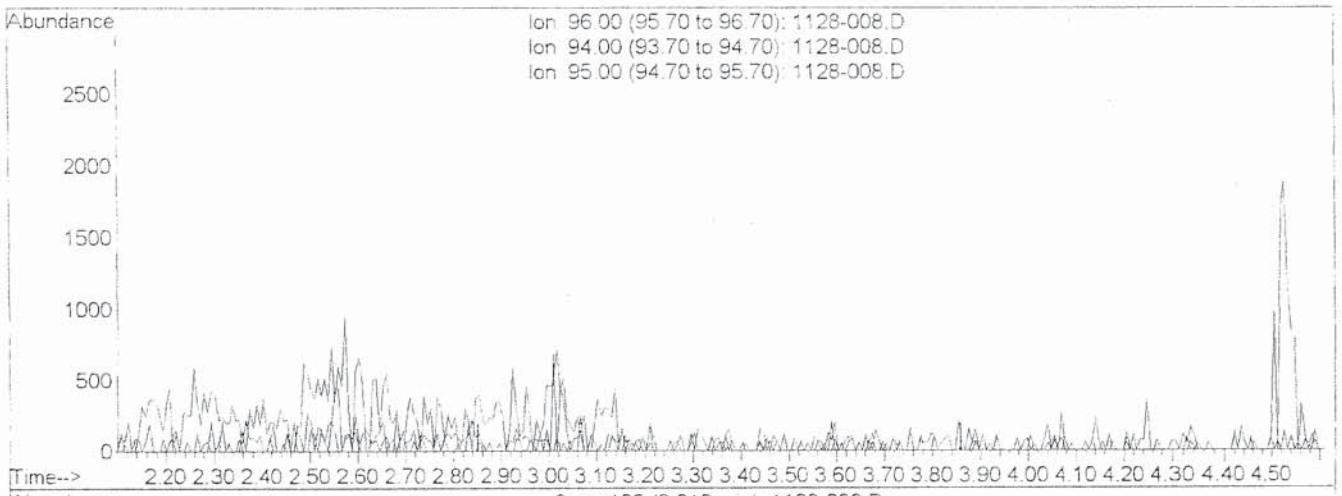
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2.) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JSG
DATE 1/6/15

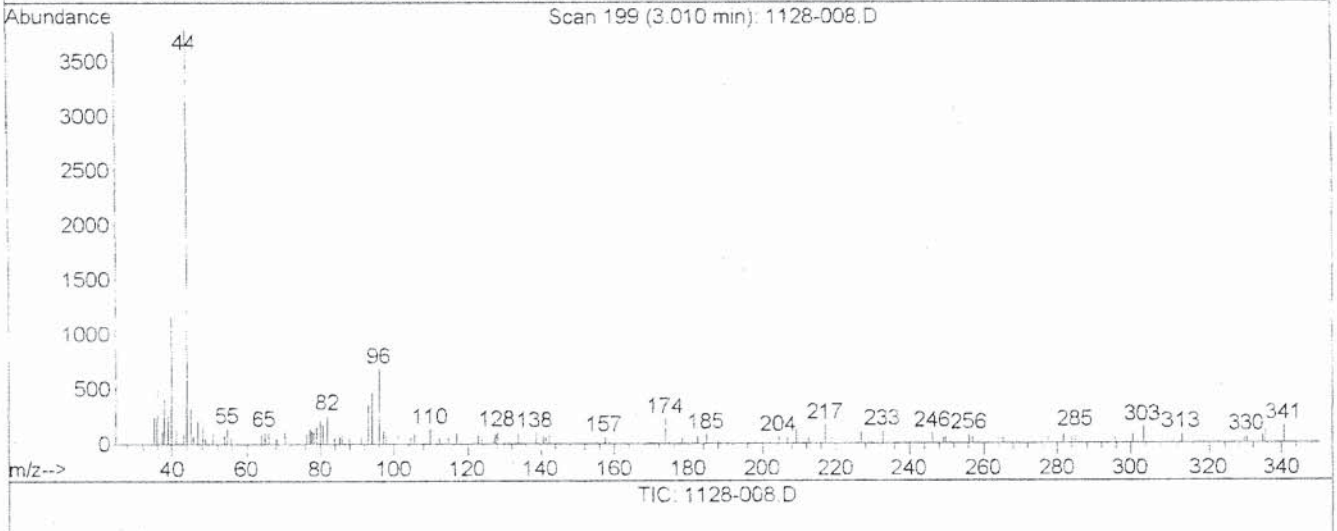
1128-008.D 141118W.M Sun Nov 30 12:42:39 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:42 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(5) Bromomethane (T)

3.01min 0.00ug/L

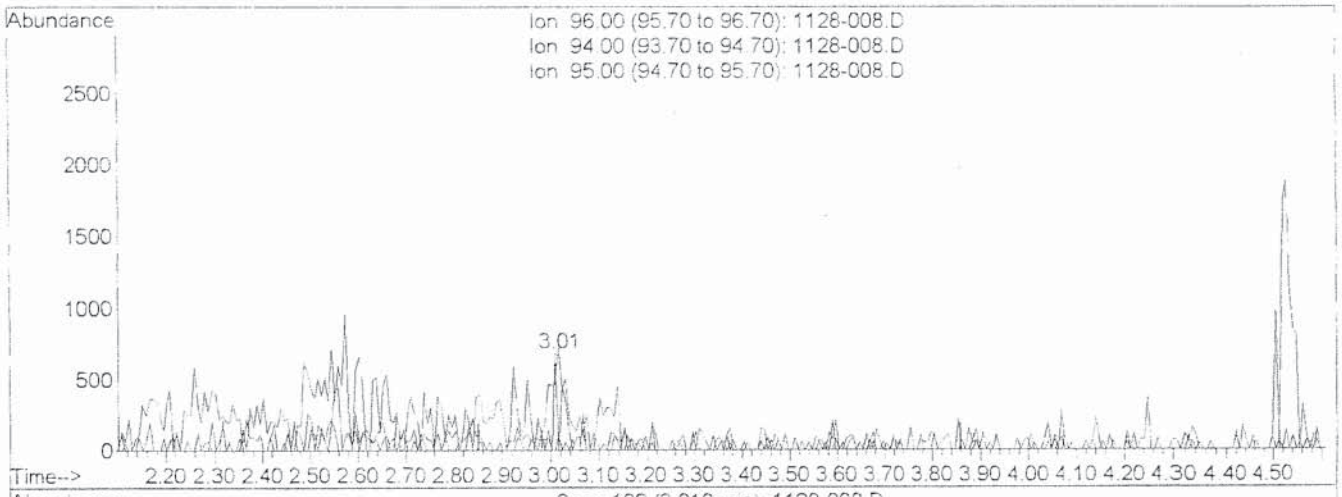
response 0

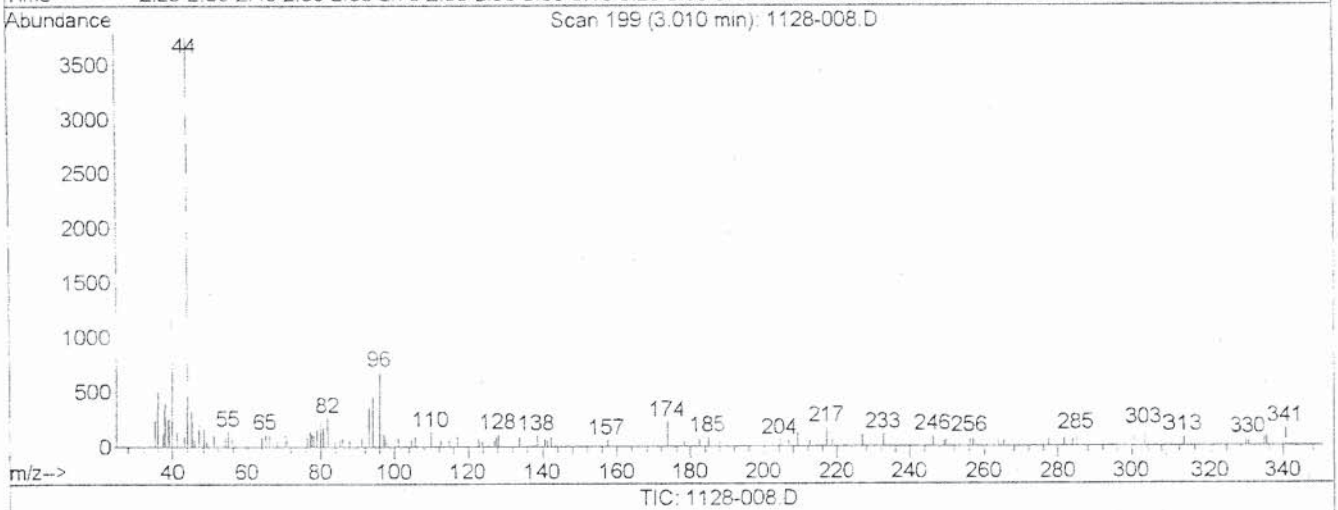
Ion	Exp%	Act%
96.00	100	0.00
94.00	99.90	0.00#
95.00	15.00	0.00#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:42 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(5) Bromomethane (T)

3.01min 8.41ug/L m

response 842

Ion	Exp%	Act%
96.00	100	100
94.00	99.90	0.00#
95.00	15.00	0.00#
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
(3) PEAK NOT FOUND
4. OTHER
ANALYST
DATE 11/6/15

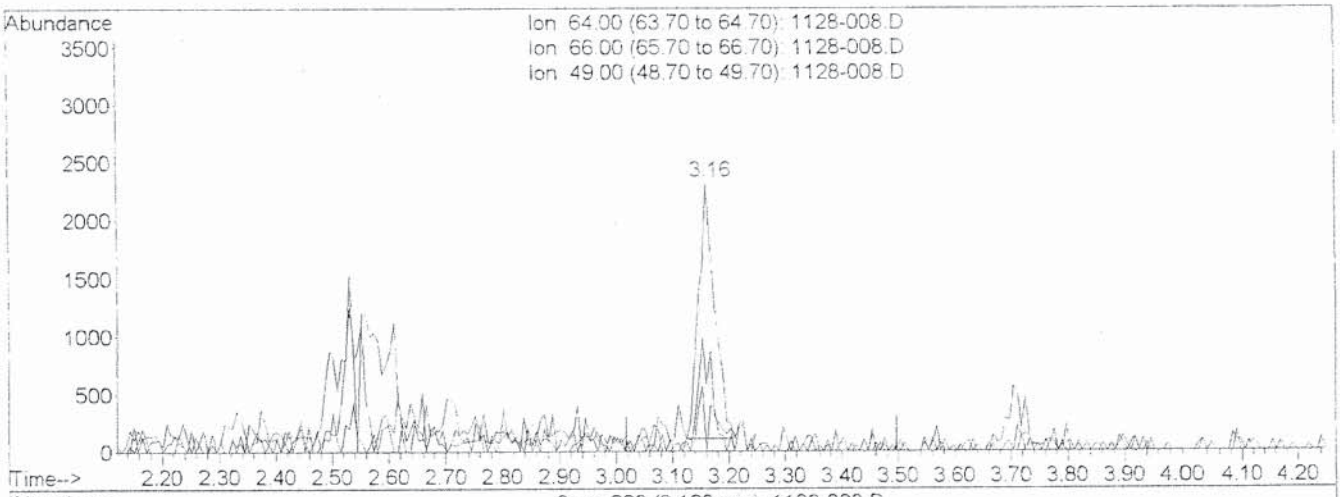
241

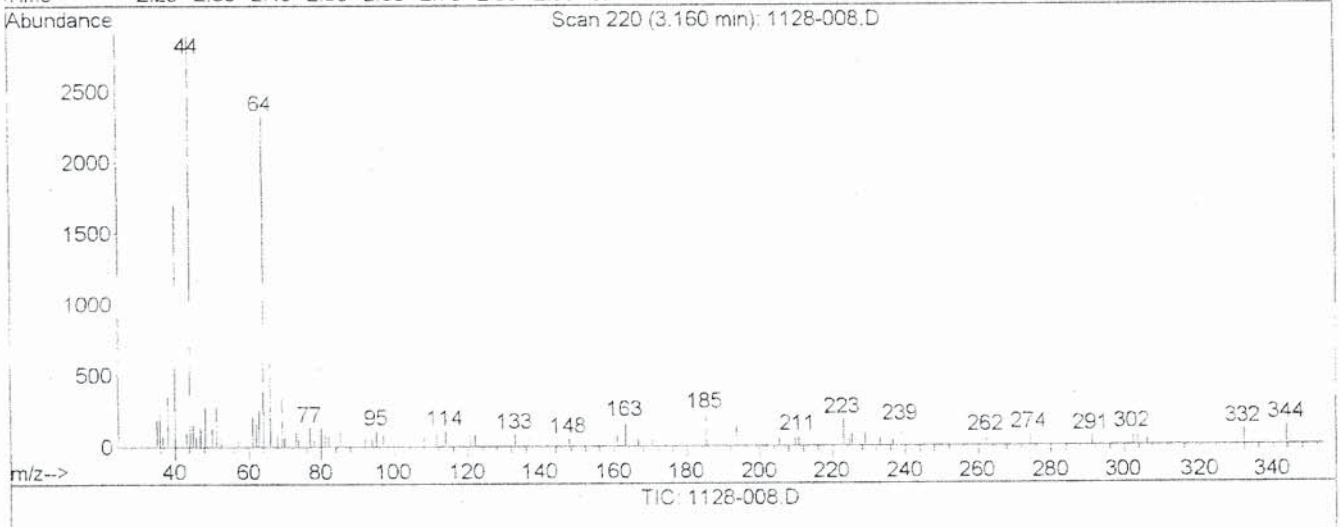
1128-008.D 141118W.M Sun Nov 30 12:42:47 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:42 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(6) Chloroethane (T)

3.16min 0.80ug/L

response 4416

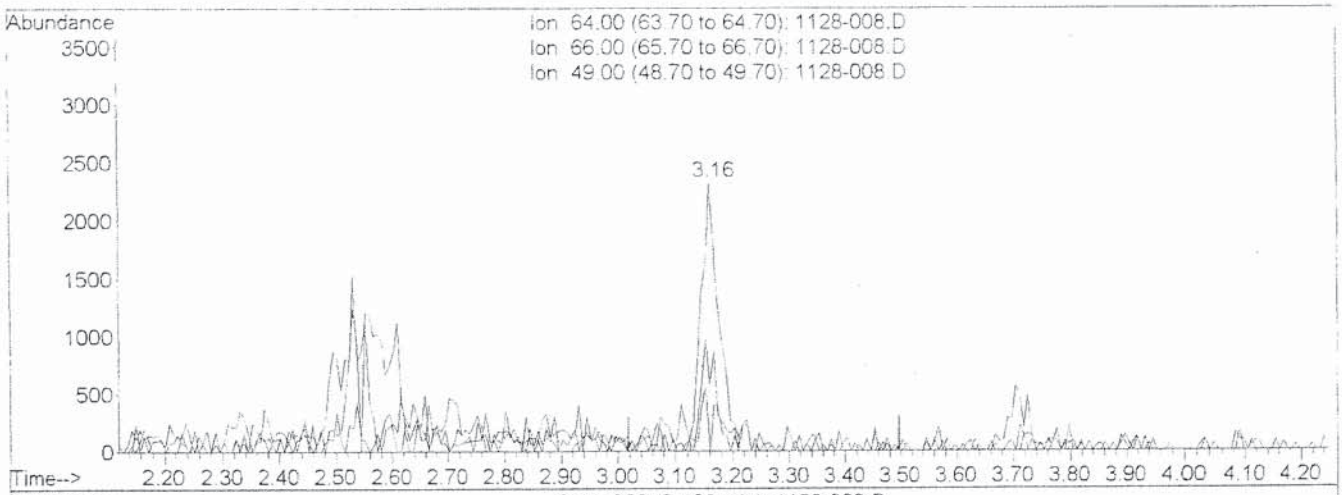
Ion	Exp%	Act%
64.00	100	100
66.00	30.30	0.00#
49.00	27.50	11.75#
0.00	0.00	0.00

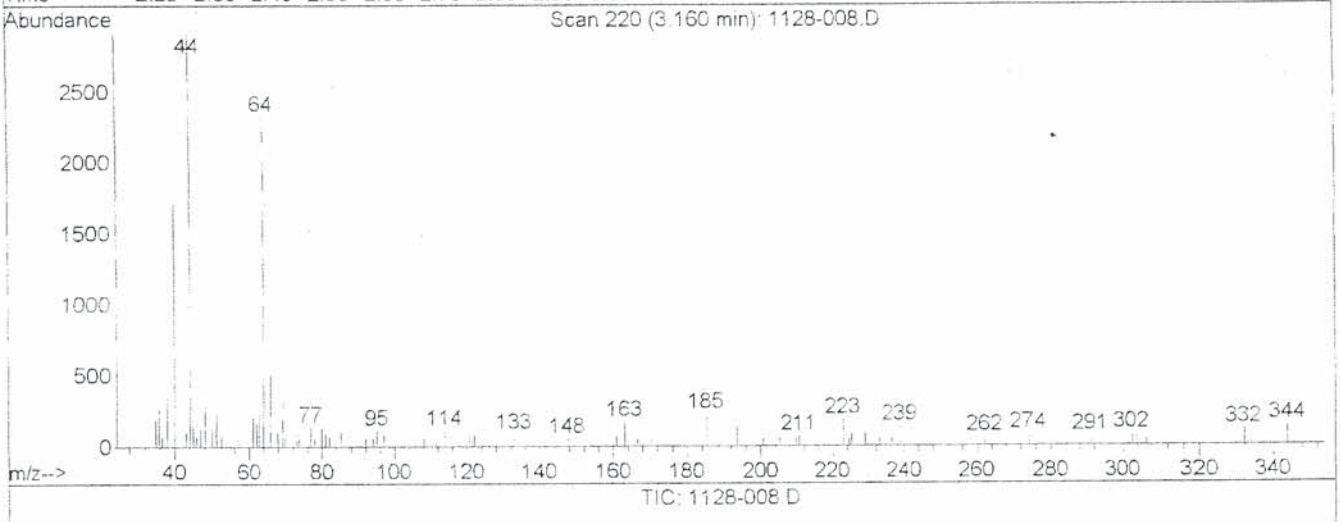
1128-008.D 141118W.M Sun Nov 30 12:42:50 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:43 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(6) Chloroethane (T)

3.16min 0.90ug/L m

response 4977

Ion	Exp%	Act%
64.00	100	100
66.00	30.30	0.00#
49.00	27.50	10.43#
0.00	0.00	0.00

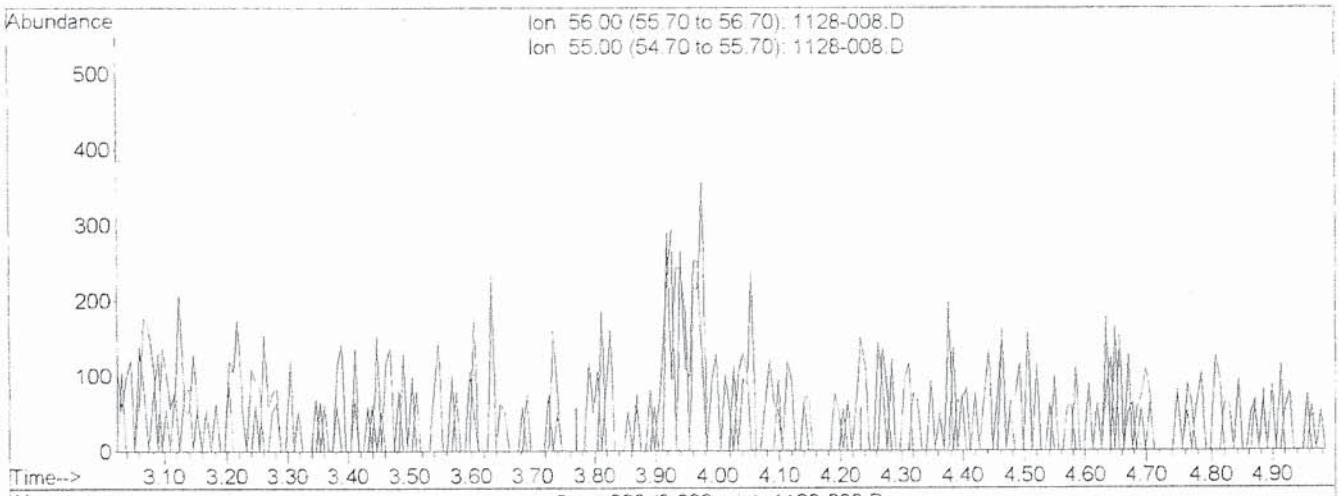
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER_____
ANALYST JGU
DATE 1/16/15

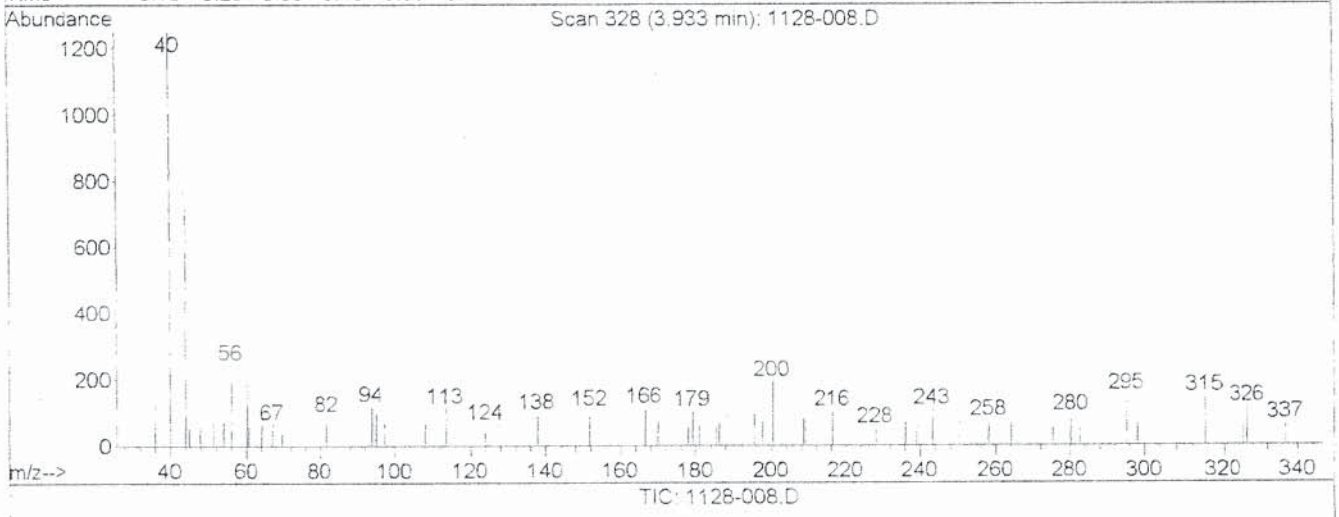
1128-008.D 141118W.M Sun Nov 30 12:43:02 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:43 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(8) Acrolein (T)

3.93min 0.00ug/L

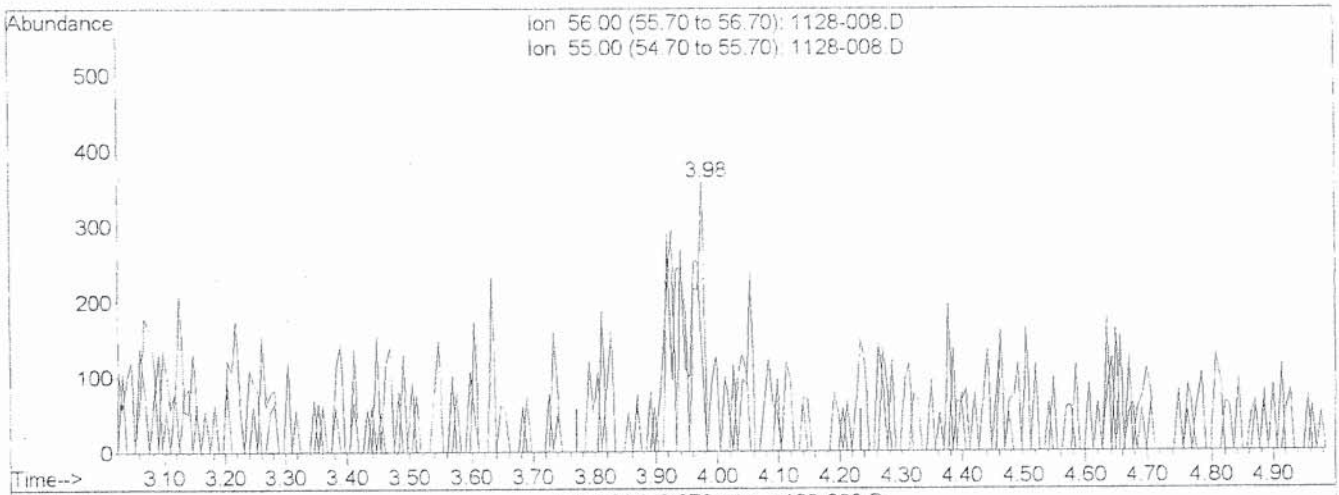
response 0

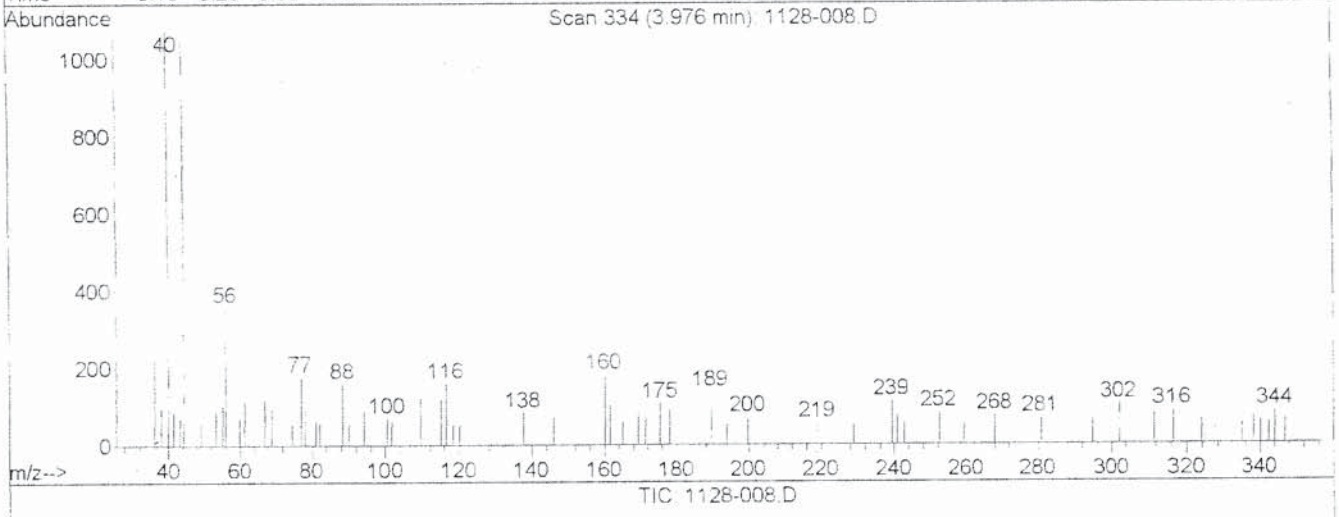
Ion	Exp%	Act%
56.00	100	0.00
55.00	72.90	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:43 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(8) Acrolein (T)

3.98min -1.00ug/L m

response 793

Ion	Exp%	Act%
56.00	100	100
55.00	72.90	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

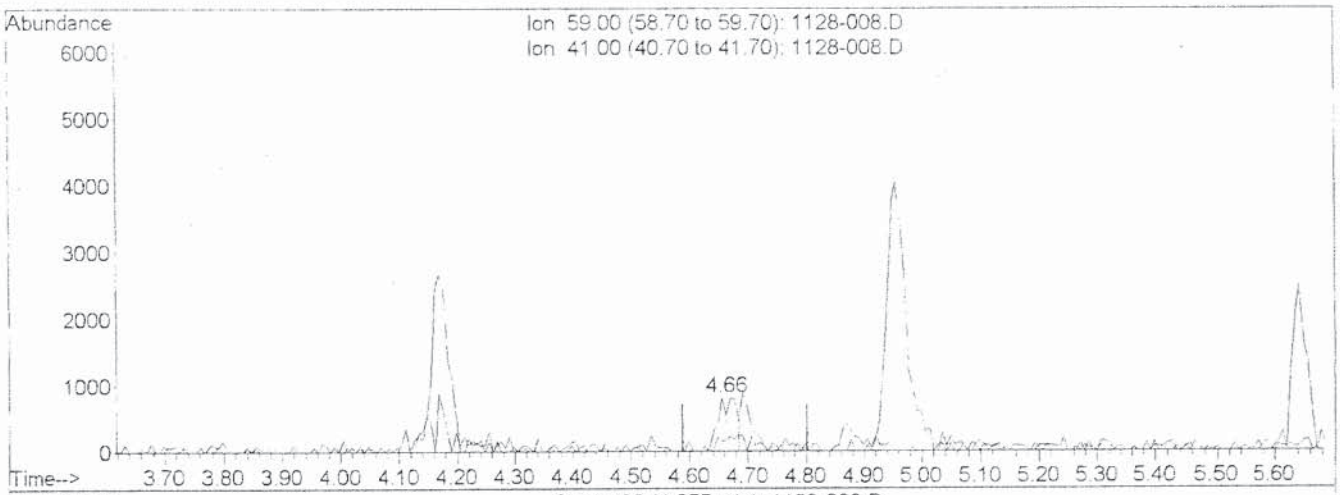
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JJG
DATE 12/6/15

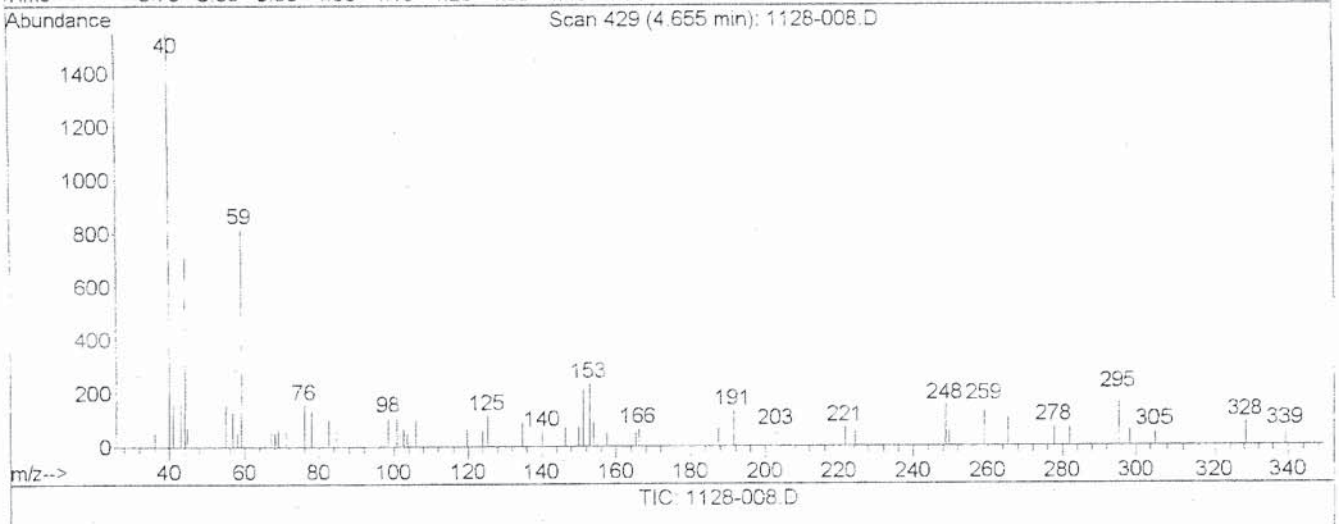
1128-008.D 141118W.M Sun Nov 30 12:43:10 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:43 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(14) tert-Butyl Alcohol (T)

4.66min 2.80ug/L

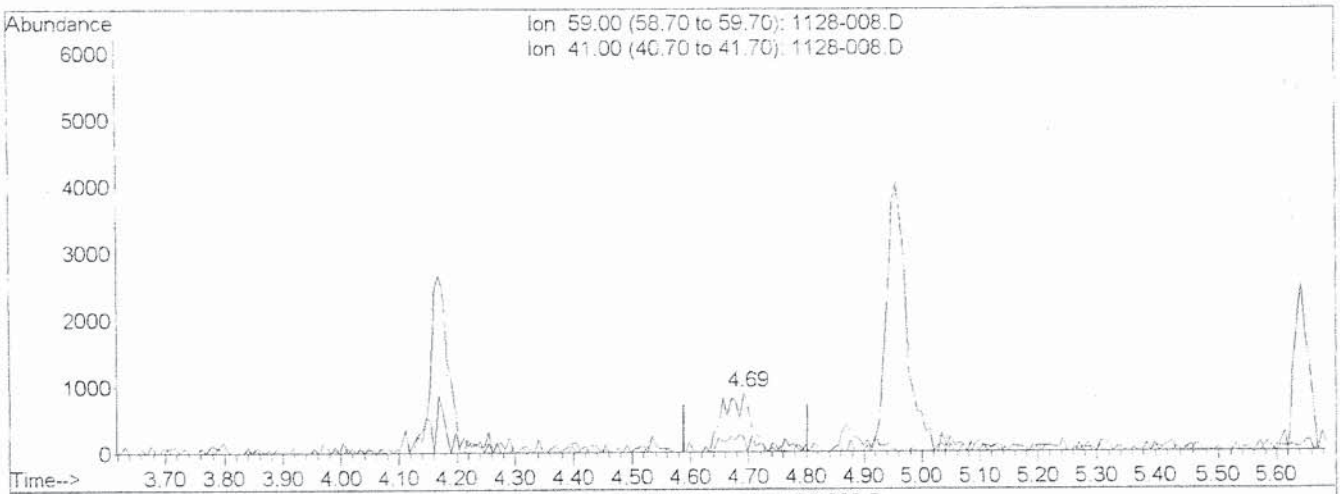
response 1839

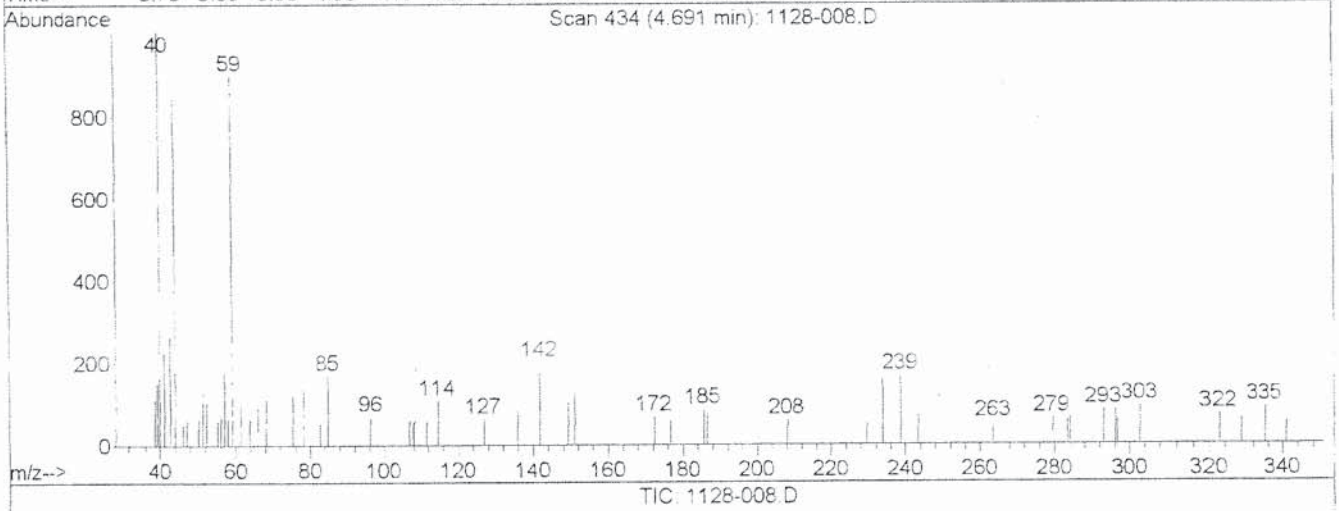
Ion	Exp%	Act%
59.00	100	100
41.00	23.90	36.92#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:43 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(14) tert-Butyl Alcohol (T)

4.69min 4.44ug/L m

response 2919

Ion	Exp%	Act%
59.00	100	100
41.00	23.90	23.26
0.00	0.00	0.00
0.00	0.00	0.00

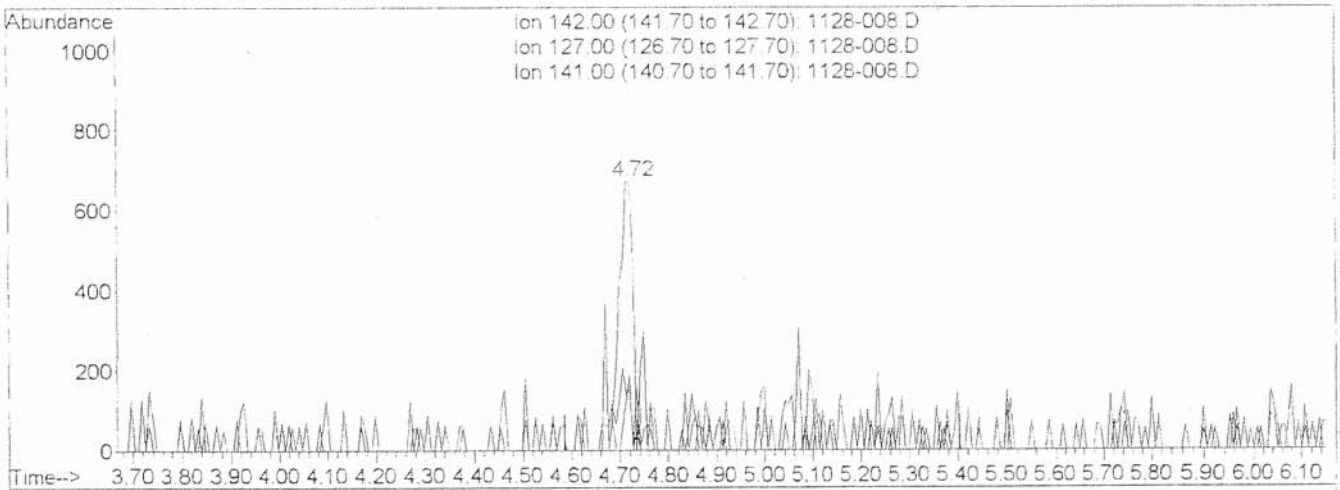
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JDB
DATE 1/6/15

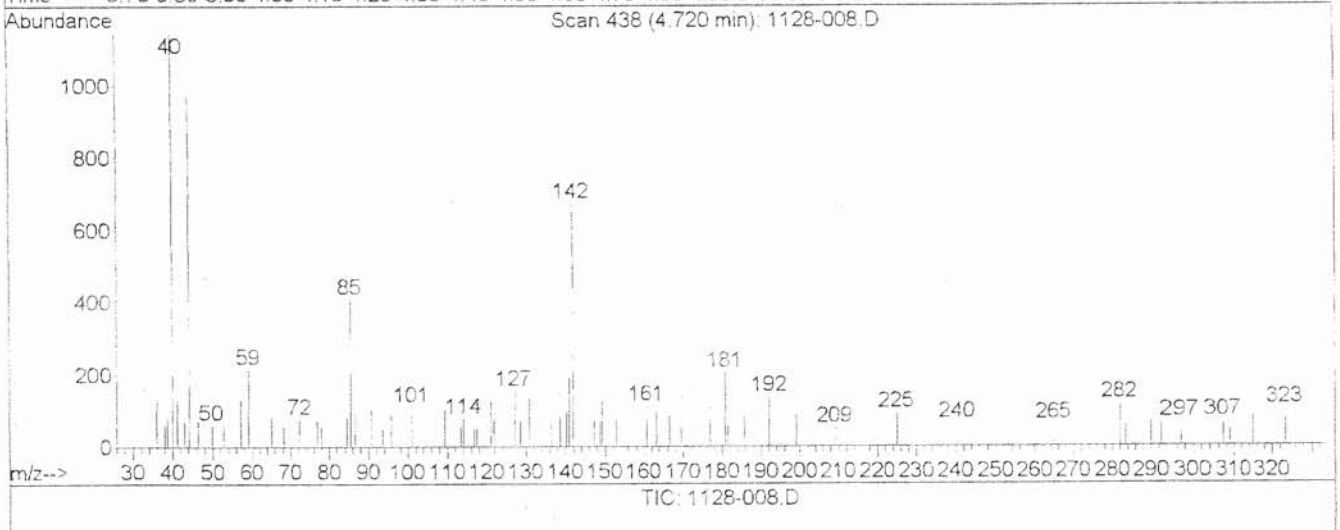
1128-008.D 141118W.M Sun Nov 30 12:43:25 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:43 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(15) Iodomethane (T)

4.72min 0.59ug/L

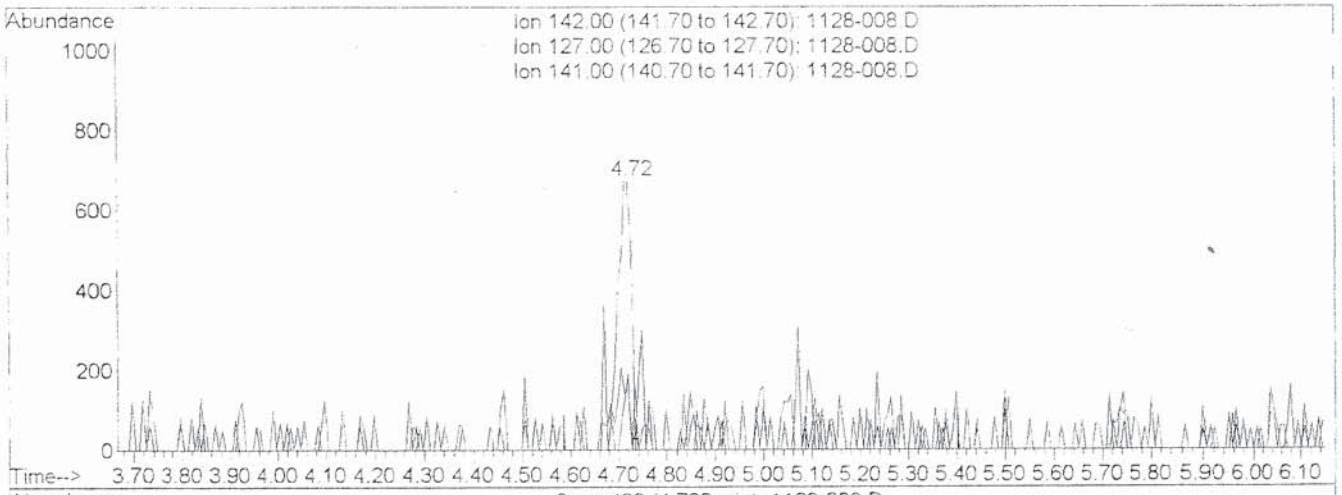
response 1373

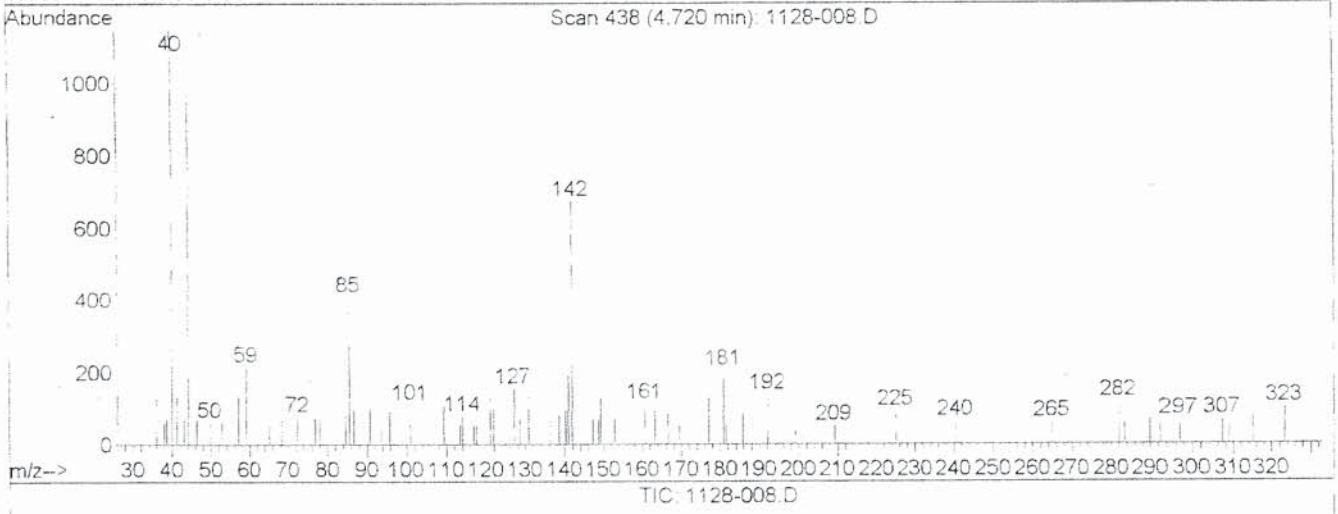
Ion	Exp%	Act%
142.00	100	100
127.00	41.50	36.49
141.00	12.70	0.00#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:43 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(15) Iodomethane (T)

4.72min 0.64ug/L m

response 1591

Ion	Exp%	Act%
142.00	100	100
127.00	41.50	31.49#
141.00	12.70	0.00#
0.00	0.00	0.00

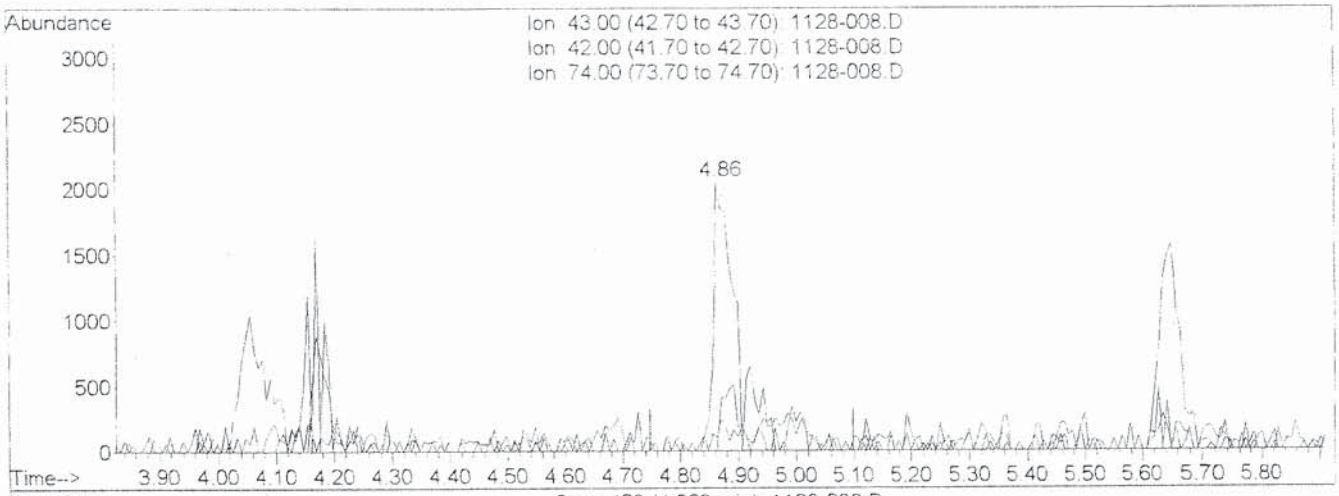
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST AJC
DATE 1/6/15

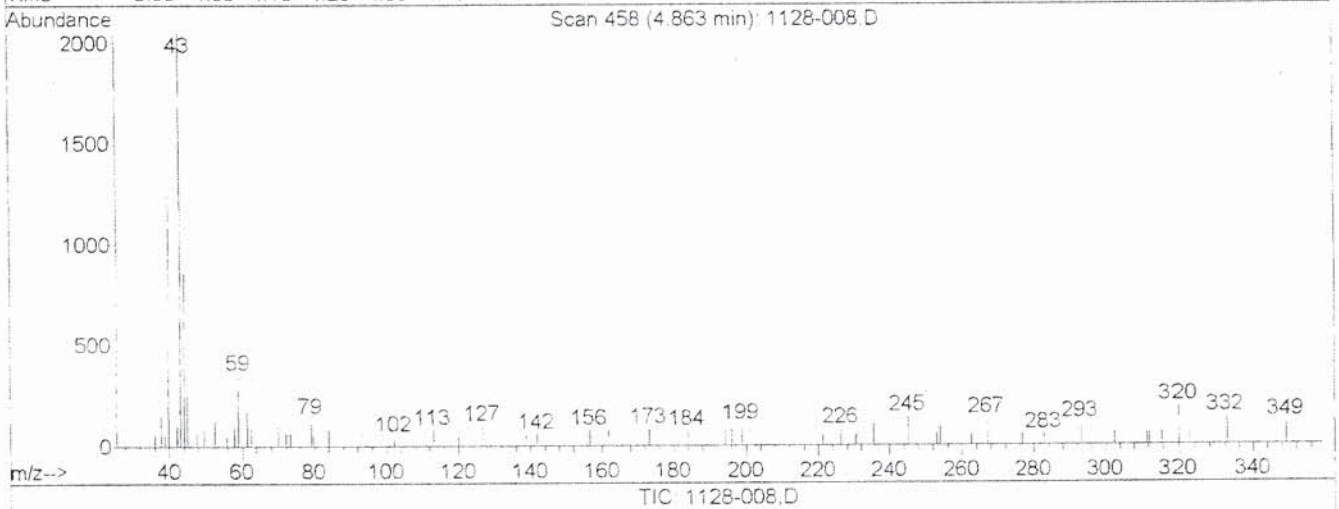
1128-008.D 141118W.M Sun Nov 30 12:43:32 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:43 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(18) Methyl Acetate (T)

4.86min 0.65ug/L

response 4501

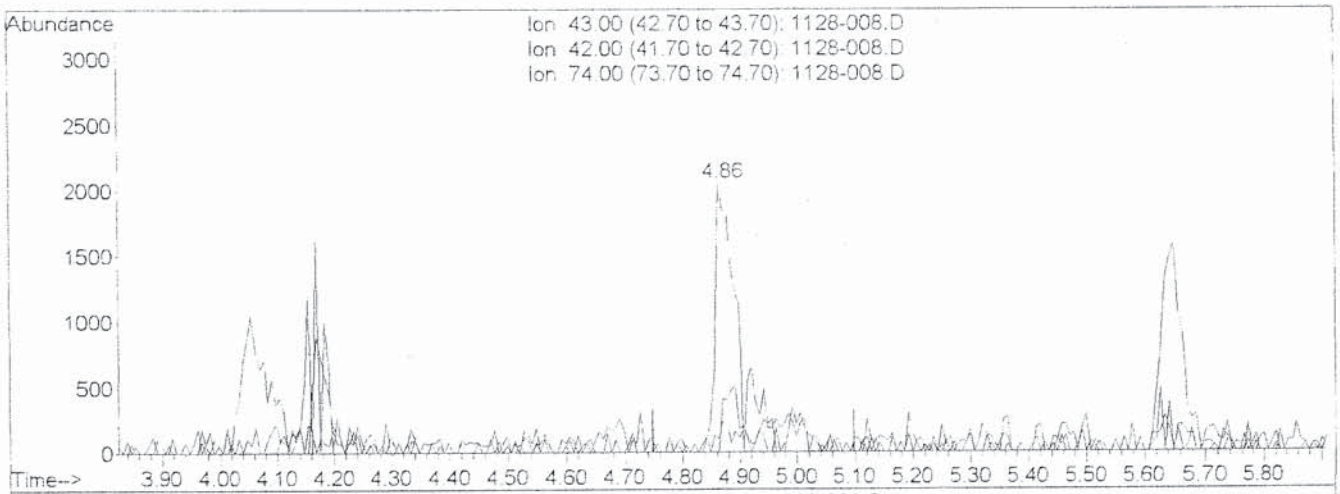
Ion	Exp%	Act%
43.00	100	100
42.00	10.40	0.00#
74.00	18.20	21.84
0.00	0.00	0.00

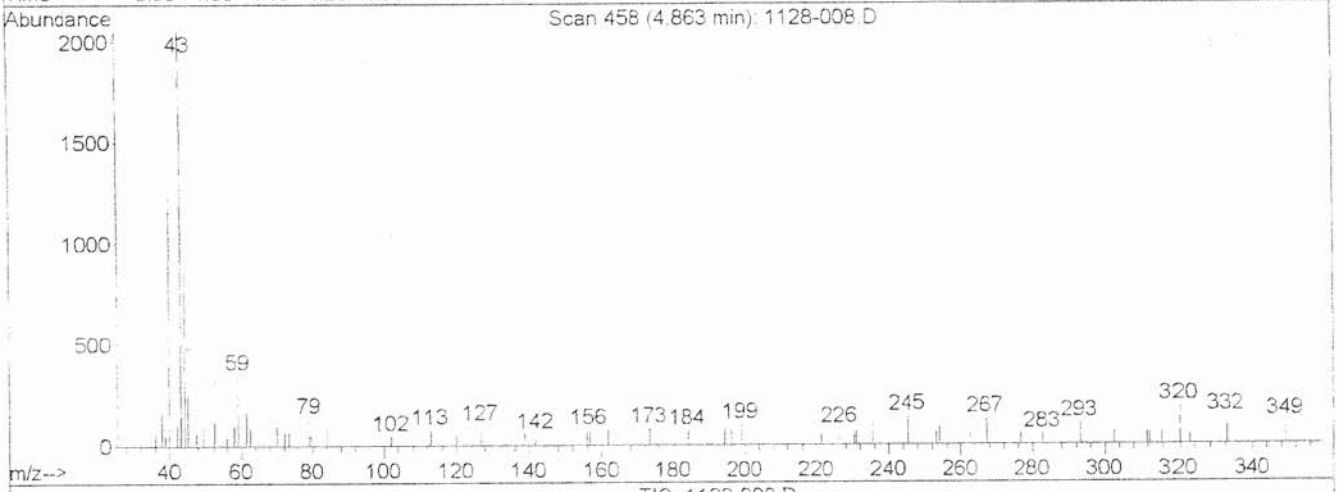
1128-008.D 141118W.M Sun Nov 30 12:43:41 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:43 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(18) Methyl Acetate (T)

4.86min 0.93ug/L m

response 6453

ion	Exp%	Act%
43.00	100	100
42.00	10.40	0.00#
74.00	18.20	15.23
0.00	0.00	0.00

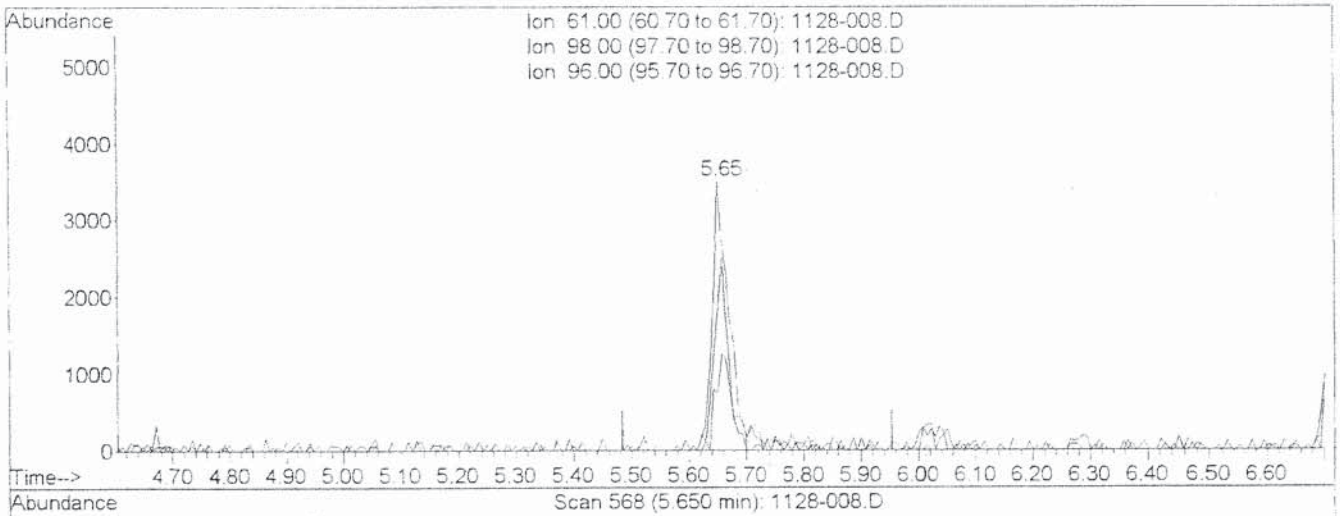
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 1/6/15

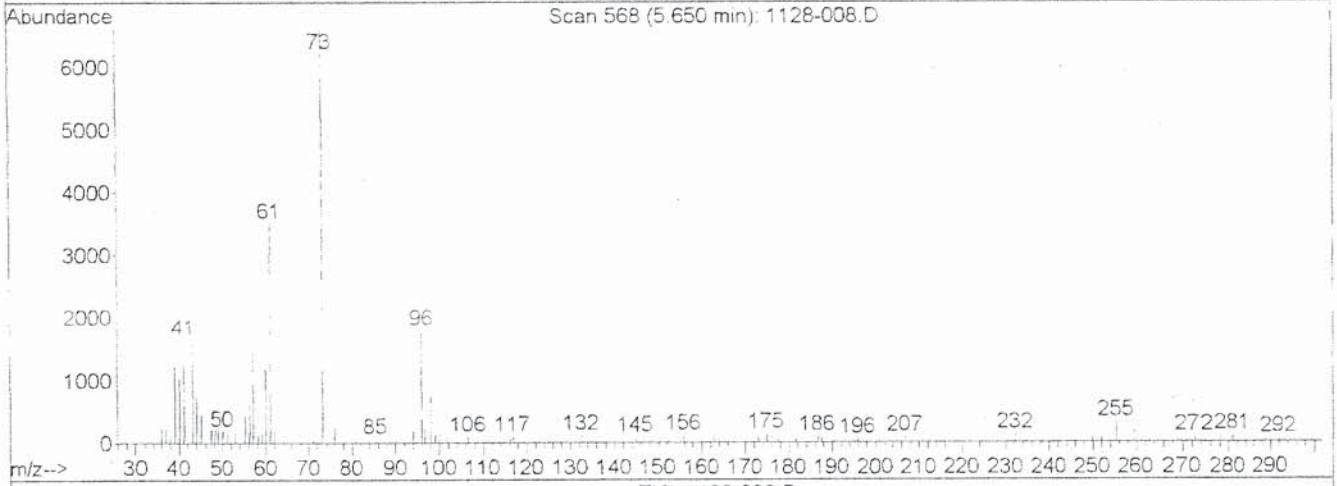
1128-008.D 141118W.M Sun Nov 30 12:43:46 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:43 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(22) trans-1,2-Dichloroethene (T)

5.65min 0.71ug/L

response 6963

Ion	Exp%	Act%
61.00	100	100
98.00	38.00	35.73
96.00	58.50	70.92#
0.00	0.00	0.00

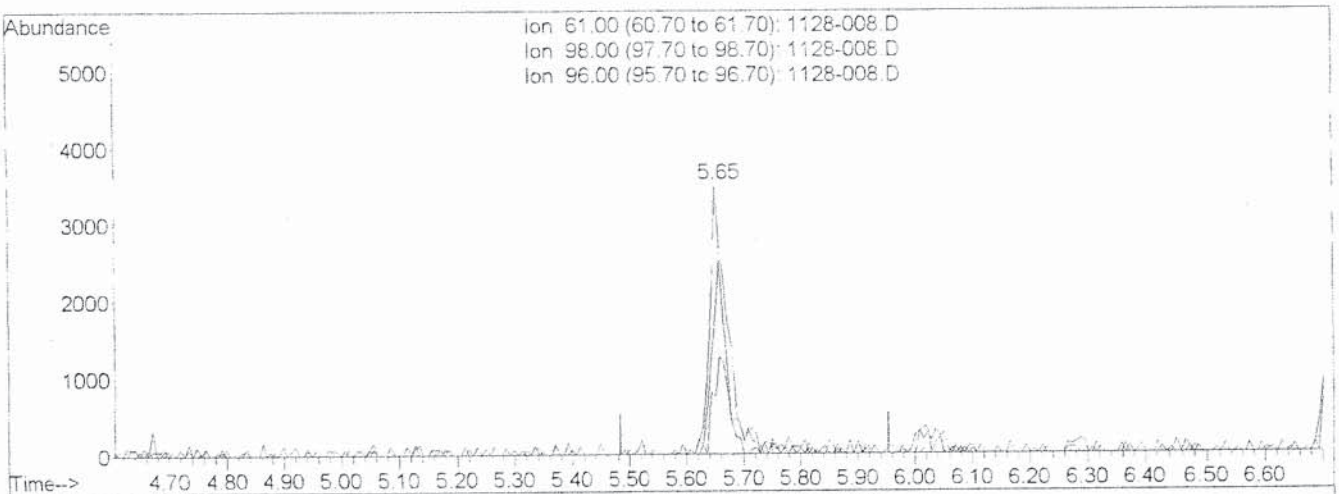
Quantitation Report (Qedit)

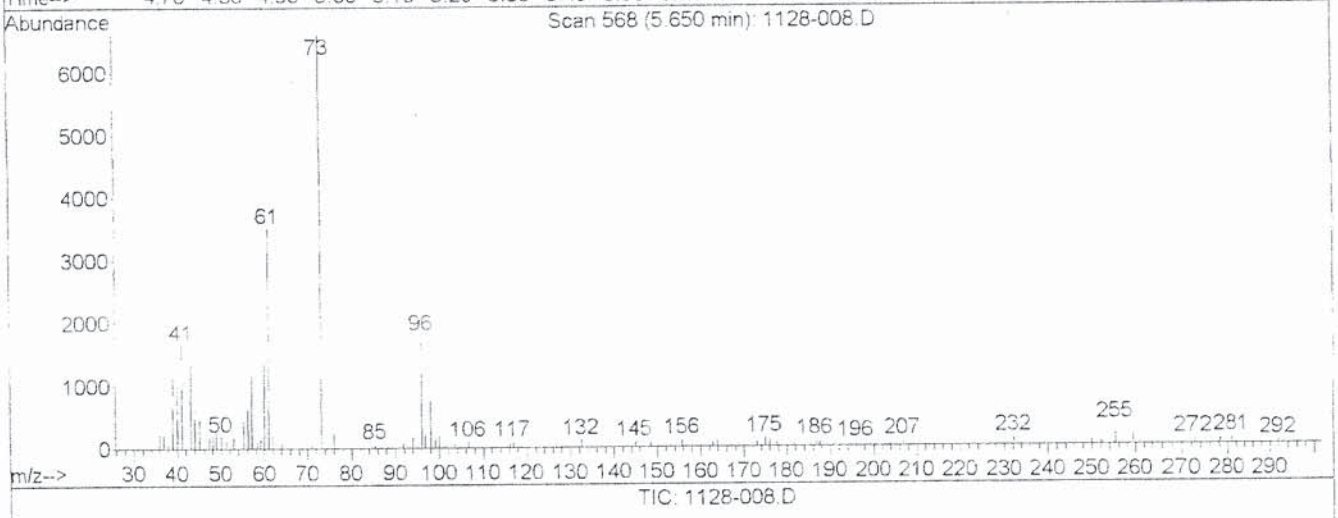
Data File : I:\MS52\DATA\MS52-141128\1128-008.D
Acq On : 28 Nov 2014 5:30 pm
Sample : ICAL1
Misc : 8260B
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:44 2014

Vial: 8
Operator: JDB
Inst : ms52
Multiplr: 1.00

Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(22) trans-1,2-Dichloroethene (T)

5.65min 0.77ug/L m

response 7506

Ion	Exp%	Act%
61.00	100	100
98.00	38.00	33.15
96.00	58.50	65.79
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER

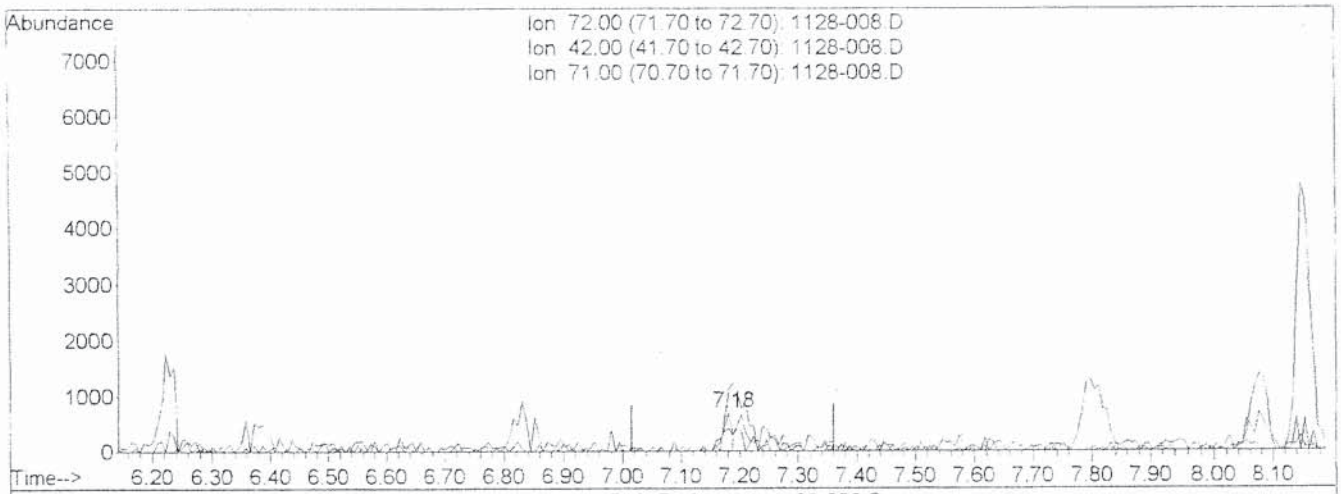
ANALYST JJC
DATE 12/6/15

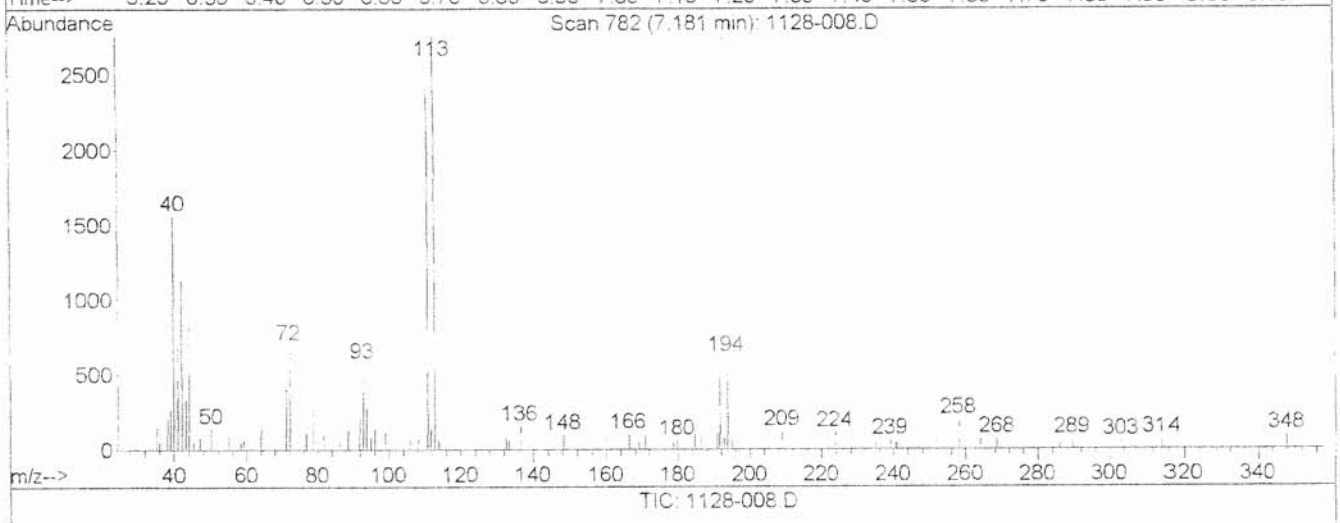
1128-008.D 141118W.M Sun Nov 30 12:44:00 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:44 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(40) Tetrahydrofuran (T)

7.18min 0.77ug/L

response 699

Ion	Exp%	Act%
72.00	100	100
42.00	274.40	411.16#
71.00	95.30	136.05#
0.00	0.00	0.00

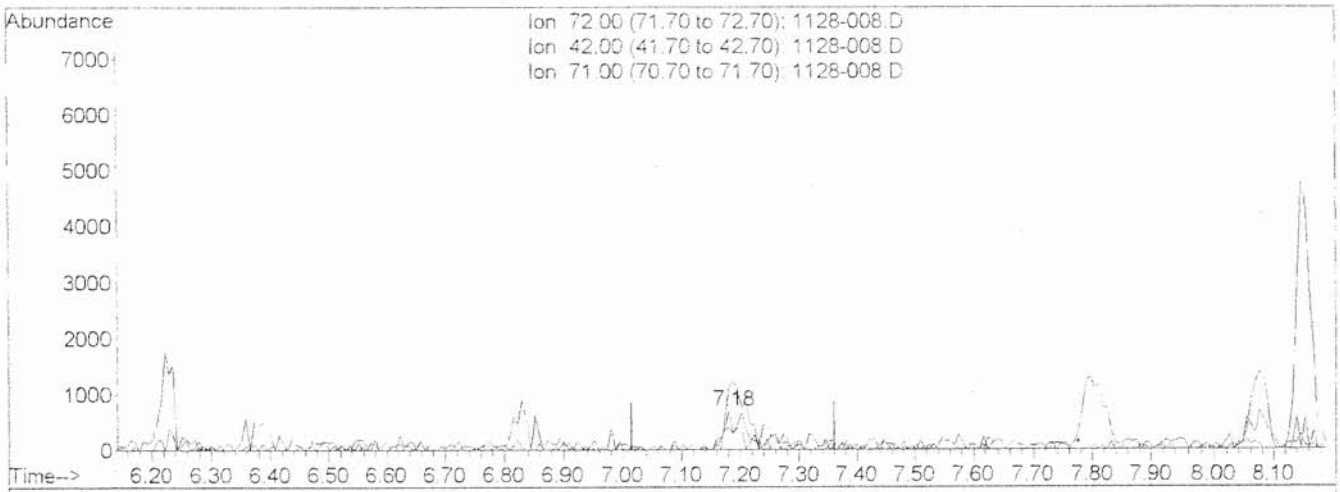
AJG

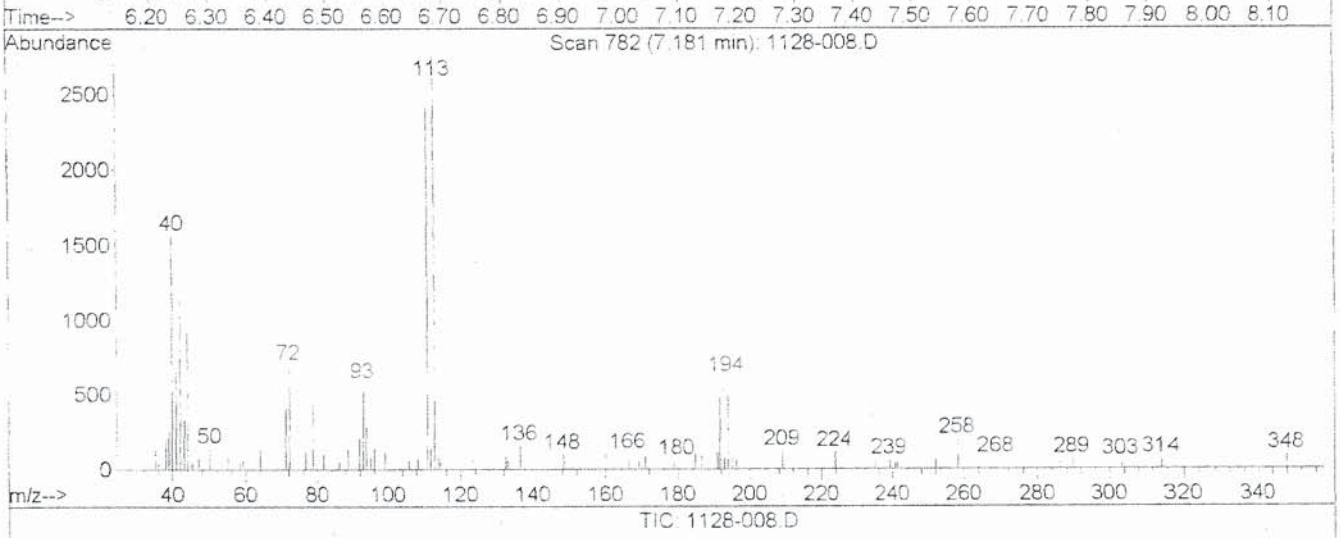
1128-008.D 141118W.M Sun Nov 30 12:44:30 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:44 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(40) Tetrahydrofuran (T)

7.18min 1.74ug/L m

response 1572

ion	Exp%	Act%
72.00	100	100
42.00	274.40	182.82#
71.00	95.30	60.50#
0.00	0.00	0.00

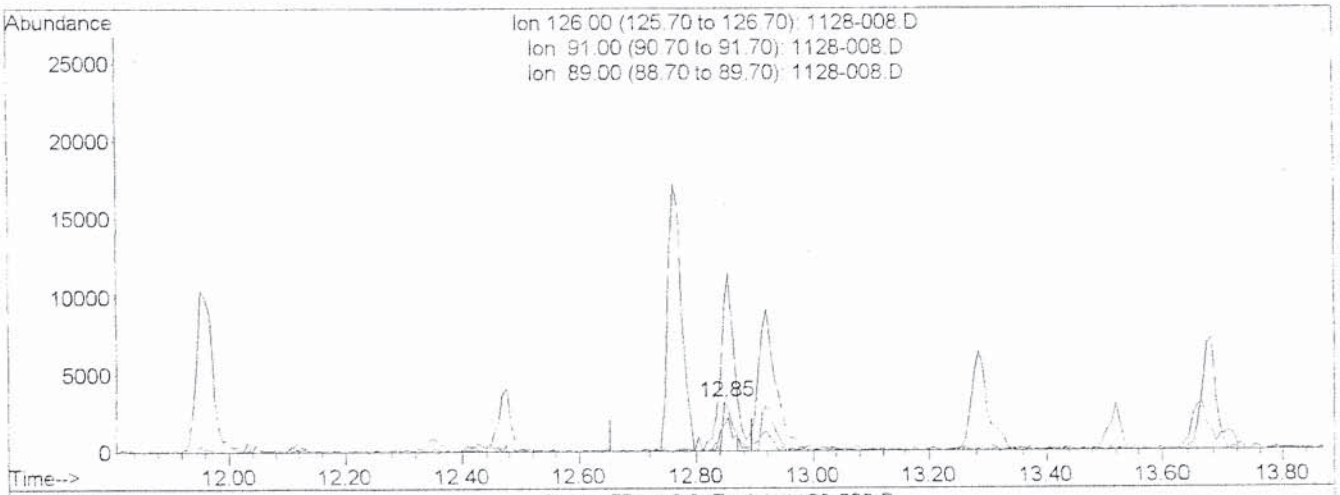
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2.) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JJU
DATE 1/16/15

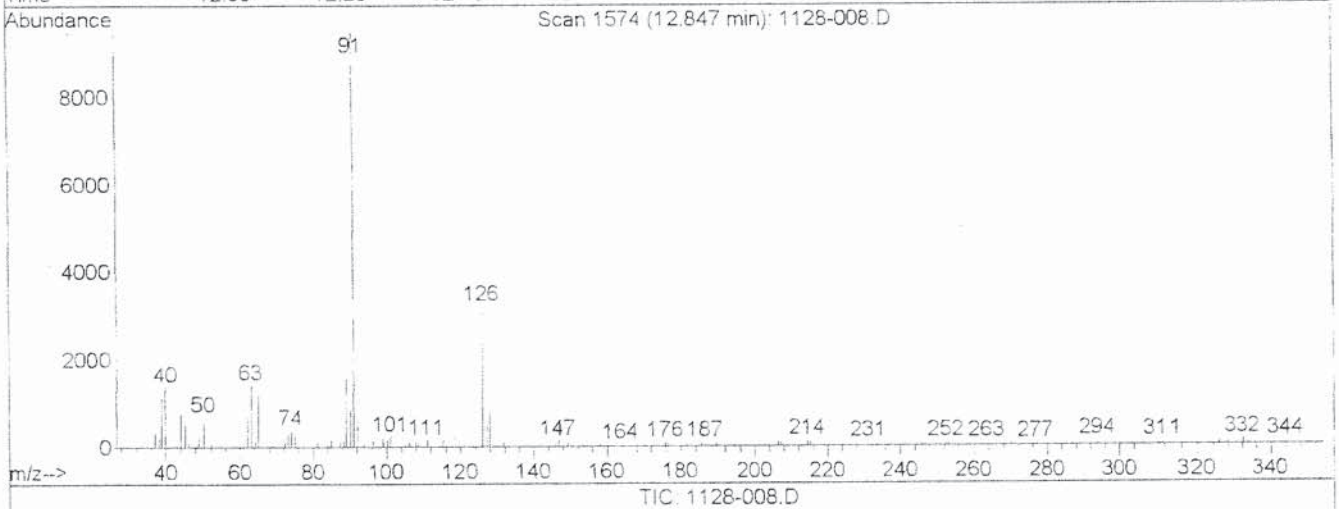
1128-008.D 141118W.M Sun Nov 30 12:44:36 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:44 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(91) 2-Chlorotoluene (T)

12.85min 0.66ug/L

response 3945

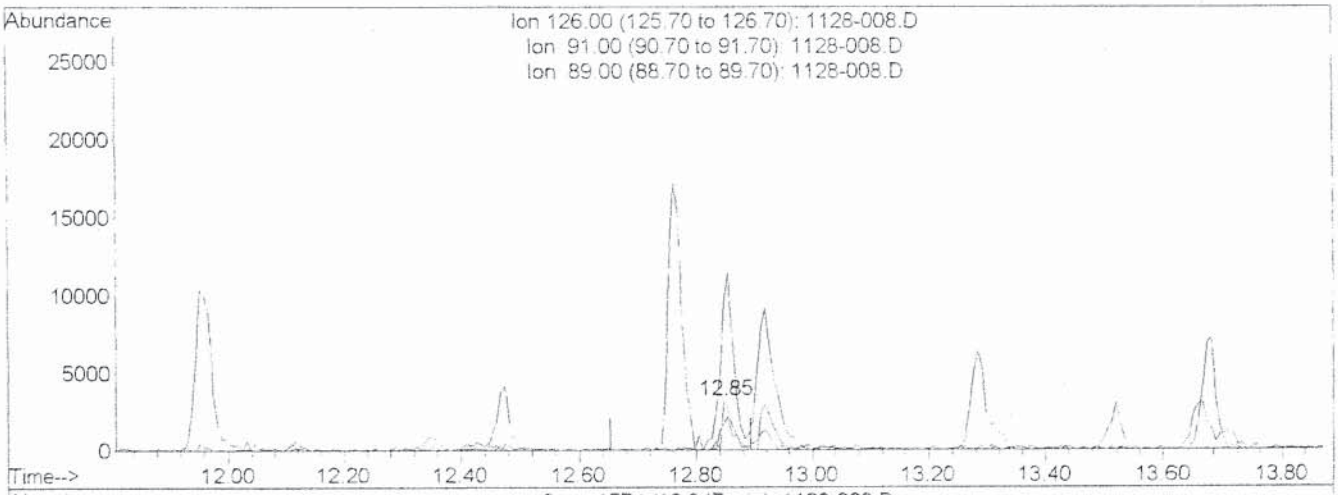
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	441.88#
89.00	59.80	68.44
0.00	0.00	0.00

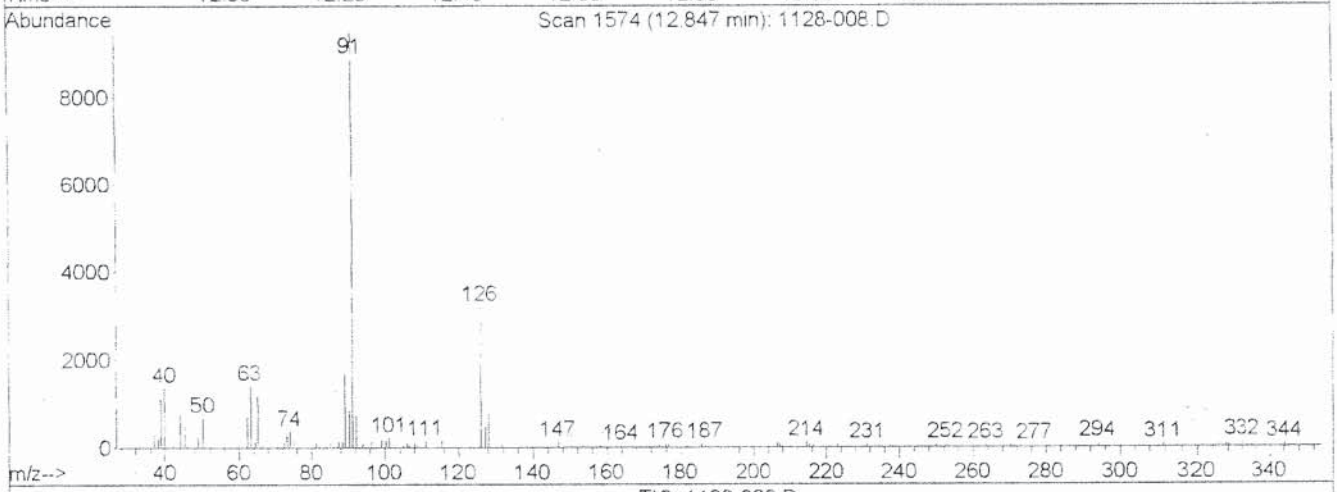
1128-008.D 141118W.M Sun Nov 30 12:45:31 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-008.D Vial: 8
Acq On : 28 Nov 2014 5:30 pm Operator: JDB
Sample : ICAL1 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:45 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-008.D

(91) 2-Chlorotoluene (T)

12.85min 0.72ug/L m

response 4273

Ion	Exp%	Act%
126.00	100	100
91.00	355.90	407.96
89.00	59.80	63.19
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 1/6/15

1128-008.D 141118W.M Sun Nov 30 12:45:38 2014

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:50 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Fluorobenzene	8.15	96	858495	50.00 ug/L	0.00
56) Chlorobenzene-d5	11.27	82	412150	50.00 ug/L	0.00
84) 1,4-Dichlorobenzene-d4	13.67	152	312799	50.00 ug/L	0.00
System Monitoring Compounds					
37) Dibromofluoromethane	7.13	111	189809	50.34 ug/L	0.00
Spiked Amount 50.000	Range 86 - 112		Recovery = 100.68%		
41) 1,2-Dichloroethane-d4	7.62	65	252289	44.45 ug/L	0.00
Spiked Amount 50.000	Range 72 - 121		Recovery = 88.90%		
65) Toluene-d8	9.84	98	917659	54.78 ug/L	0.00
Spiked Amount 50.000	Range 88 - 115		Recovery = 109.56%		
87) 4-Bromofluorobenzene	12.46	95	334167	44.06 ug/L	0.00
Spiked Amount 50.000	Range 86 - 113		Recovery = 88.12%		
Target Compounds					Qvalue
2) Dichlorodifluoromethane	2.14	85	40377m	5.03 ug/L	
3) Chloromethane (P)	2.38	50	37661	3.84 ug/L	96
4) Vinyl Chloride (C)	2.52	62	41611	5.16 ug/L	95
5) Bromomethane	3.01	96	6890	9.97 ug/L #	95
6) Chloroethane	3.15	64	31920	5.86 ug/L	99
7) 1,2-Dichlorotrifluoroethan	3.71	67	45589	5.65 ug/L	97
8) Acrolein	3.93	56	3273m	Below Cal	
9) Acetonitrile	4.16	41	10307m	11.91 ug/L	
10) Trichlorofluoromethane	3.70	101	45505	5.34 ug/L	91
11) Acetone	4.04	43	12605	5.15 ug/L #	90
12) Diethyl Ether	4.16	59	31809	4.95 ug/L	100
13) 1,1-Dichloroethene (C)	4.52	61	52466	6.58 ug/L	98
14) tert-Butyl Alcohol	4.65	59	12439	19.17 ug/L	94
15) Iodomethane	4.71	142	12169	2.81 ug/L	93
16) Acrylonitrile	4.88	53	13260	8.02 ug/L	93
17) Methylene Chloride	4.98	84	35139	5.54 ug/L	98
18) Methyl Acetate	4.86	43	32023	4.70 ug/L	96
19) Allyl Chloride	4.95	41	62668	5.16 ug/L #	98
20) 1,1,2-Trichlorotrifluoroet	4.61	101	27576	9.80 ug/L	97
21) Carbon Disulfide	5.05	76	103667	5.67 ug/L	96
22) trans-1,2-Dichloroethene	5.65	61	48671	5.06 ug/L	98
23) Methyl tert-Butyl Ether	5.64	73	90683	4.49 ug/L #	98
24) 1,1-Dichloroethane (P)	6.02	63	66935	5.40 ug/L	99
25) Propionitrile	6.19	54	2915	12.96 ug/L #	1
26) Vinyl Acetate	6.09	43	71723	4.00 ug/L	99
27) Chloroprene	6.27	53	57935	4.45 ug/L	95
28) Hexane	6.22	57	63303	4.68 ug/L #	95

(#) = qualifier out of range (m) = manual integration
1128-009.D 141118W.M Sun Nov 30 12:50:15 2014

JMA 1/6/15

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:50 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
29) 2-Butanone (MEK)	6.46	43	15076m	3.93	ug/L		
30) Diisopropyl Ether	6.37	45	140173	5.12	ug/L		99
31) Methacrylonitrile	6.62	67	14794	4.77	ug/L	#	82
32) cis-1,2-Dichloroethene	6.71	61	49360	5.14	ug/L		94
33) Ethyl Acetate	6.82	70	4131	4.68	ug/L	#	82
34) Bromochloromethane	7.00	130	18657	5.67	ug/L		93
35) Chloroform (C)	6.96	83	54422	5.04	ug/L		96
36) 2,2-Dichloropropane	6.82	77	42898	4.59	ug/L	#	86
38) tert-Butyl Ethyl Ether	6.82	59	115990	4.62	ug/L	#	88
40) Tetrahydrofuran	7.18	72	8927	9.99	ug/L		90
42) 1,2-Dichloroethane	7.72	62	46275	4.88	ug/L	#	88
43) 1,1,1-Trichloroethane	7.52	97	43025	9.82	ug/L		93
44) 1,1-Dichloropropene	7.74	75	43877	9.38	ug/L		98
45) Cyclohexane	7.80	56	73111	4.94	ug/L		98
46) Isopropyl Acetate	7.80	43	75634	4.32	ug/L		99
47) Carbon Tetrachloride	7.86	117	33153	10.91	ug/L		97
48) Benzene	7.89	78	153662	5.76	ug/L		98
49) tert-Amyl Methyl Ether	8.07	43	38865	4.77	ug/L		95
50) Dibromomethane	8.81	93	19770	12.52	ug/L		98
51) 1,2-Dichloropropane (C)	8.69	63	41751	5.30	ug/L		97
52) 2-Nitropropane	8.95	43	29929	4.58	ug/L	#	78
53) Trichloroethene	8.65	130	30696	13.70	ug/L		97
54) Bromodichloromethane	8.86	83	47847	5.37	ug/L		99
57) Methyl Methacrylate	8.81	69	24538	4.47	ug/L	#	70
58) n-Propyl Acetate	8.83	43	50693	4.44	ug/L		96
59) Methyl Cyclohexane	9.02	83	70838	5.39	ug/L		96
60) 2-Chloroethyl Vinyl Ether	9.21	63	23482	4.80	ug/L	#	94
61) cis-1,3-Dichloropropene	9.43	75	55827	5.14	ug/L	#	89
62) 4-Methyl-2-pentanone (MIBK	9.36	43	35380	4.71	ug/L	#	97
63) trans-1,3-Dichloropropene	9.91	75	47103	4.48	ug/L		86
64) 1,1,2-Trichloroethane	10.06	83	27919	5.48	ug/L		95
66) Toluene (C)	9.91	92	86694	5.47	ug/L		98
67) 1,3-Dichloropropane	10.27	76	57907	5.48	ug/L		98
68) Ethyl Methacrylate	10.09	69	42927	4.47	ug/L	#	80
69) 2-Hexanone	10.21	43	19768	3.88	ug/L	#	91
70) Dibromochloromethane	10.54	129	29320	5.26	ug/L		94
71) 1,2-Dibromoethane (EDB)	10.75	107	28354	5.49	ug/L	#	97
72) Tetrachloroethene	10.64	164	20963	11.67	ug/L		94
73) 1,1,1,2-Tetrachloroethane	11.35	131	26580	5.29	ug/L		98
74) 1-Chlorohexane	11.26	91	55311	5.40	ug/L		91
75) Chlorobenzene (P)	11.30	112	92343	5.91	ug/L		98

259

(#) = qualifier out of range (m) = manual integration

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:50 2014 Quant Results File: 141118W.RES

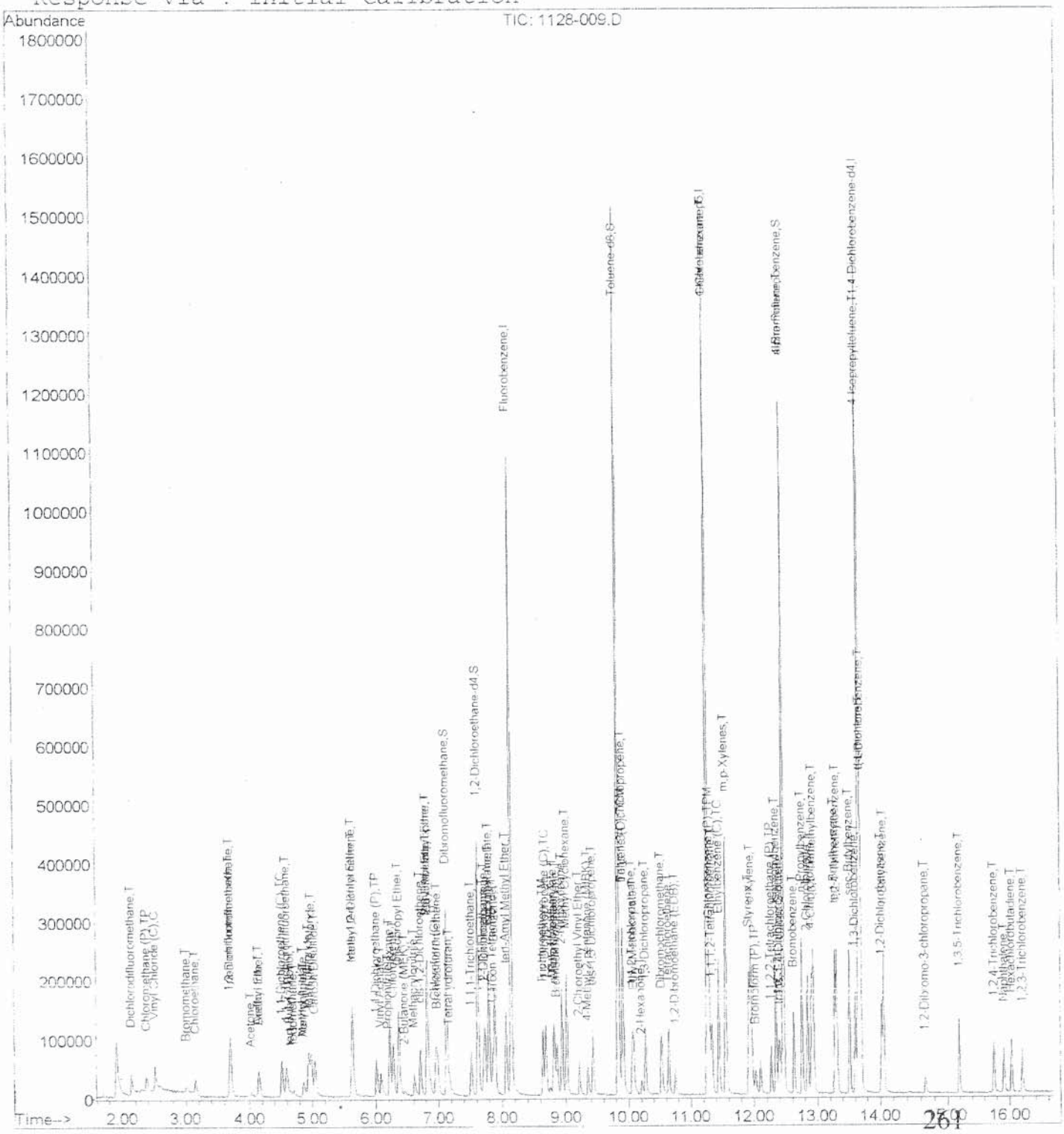
Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

	Compound	R.T.	QIon	Response	Conc Unit		Qvalue
76)	Ethylbenzene (C)	11.45	106	47394	5.18 ug/L		92
77)	m,p-Xylenes	11.56	106	123379	15.22 ug/L		98
78)	Bromoform (P)	12.03	173	13267	4.04 ug/L	#	66
79)	Cyclohexanone	12.09	55	2133	Below Cal	#	98
80)	Styrene	11.92	104	97044	5.19 ug/L	#	88
81)	1,1,2,2-Tetrachloroethane	12.28	83	40229	5.41 ug/L		99
82)	o-Xylene	11.96	106	60197	9.18 ug/L	#	94
83)	1,2,3-Trichloropropane	12.40	110	11205	5.54 ug/L		86
85)	trans-1,4-Dichloro-2-buten	12.42	53	12907	4.63 ug/L	#	3
86)	Isopropylbenzene	12.35	120	38709	4.94 ug/L		98
88)	alpha-Pinene	12.47	93	91366	4.88 ug/L		99
89)	Bromobenzene	12.63	77	66886	4.92 ug/L		90
90)	n-Propylbenzene	12.76	120	40074	4.79 ug/L		94
91)	2-Chlorotoluene	12.85	126	34073m	5.48 ug/L		
92)	4-Chlorotoluene	12.91	126	32152	4.60 ug/L	#	69
93)	1,3,5-Trimethylbenzene	12.94	120	58598	4.74 ug/L		98
94)	tert-Butylbenzene	13.28	91	78991m	4.12 ug/L		
95)	1,2,4-Trimethylbenzene	13.31	120	69163	4.96 ug/L	#	71
96)	sec-Butylbenzene	13.52	134	30675	4.77 ug/L		97
97)	1,3-Dichlorobenzene	13.61	146	66589	5.33 ug/L		99
98)	d-Limonene	13.70	68	60474	4.35 ug/L	#	86
99)	1,4-Dichlorobenzene	13.71	146	67938	5.04 ug/L		96
100)	4-Isopropyltoluene	13.66	134	35214	4.76 ug/L		95
101)	1,2-Dichlorobenzene	14.03	146	59446	5.02 ug/L		96
102)	n-Butylbenzene	14.06	92	76088	4.76 ug/L		95
103)	1,2-Dibromo-3-chloropropan	14.67	157	6193	4.89 ug/L		91
104)	1,3,5-Trichlorobenzene	15.19	180	36930	4.85 ug/L		97
105)	1,2,4-Trichlorobenzene	15.76	180	24646	4.15 ug/L	#	91
106)	Naphthalene	15.92	128	58625	4.56 ug/L		97
107)	Hexachlorobutadiene	16.03	225	14171	4.56 ug/L	#	95
108)	1,2,3-Trichlorobenzene	16.20	180	22027	6.08 ug/L		87

Quantitation Report

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:50 2014 Quant Results File: 141118W.RES

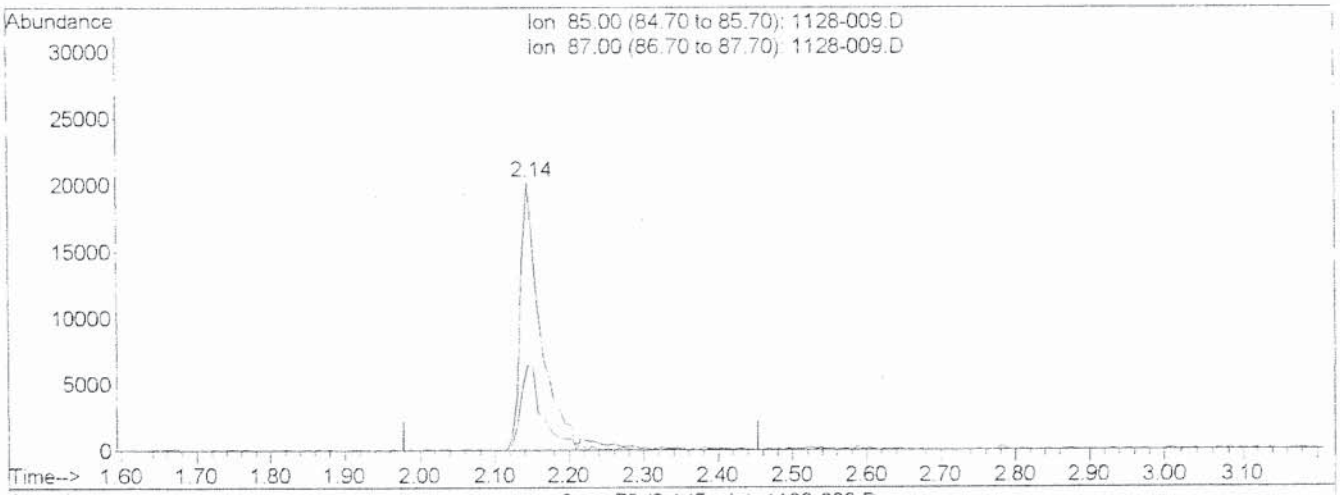
Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration

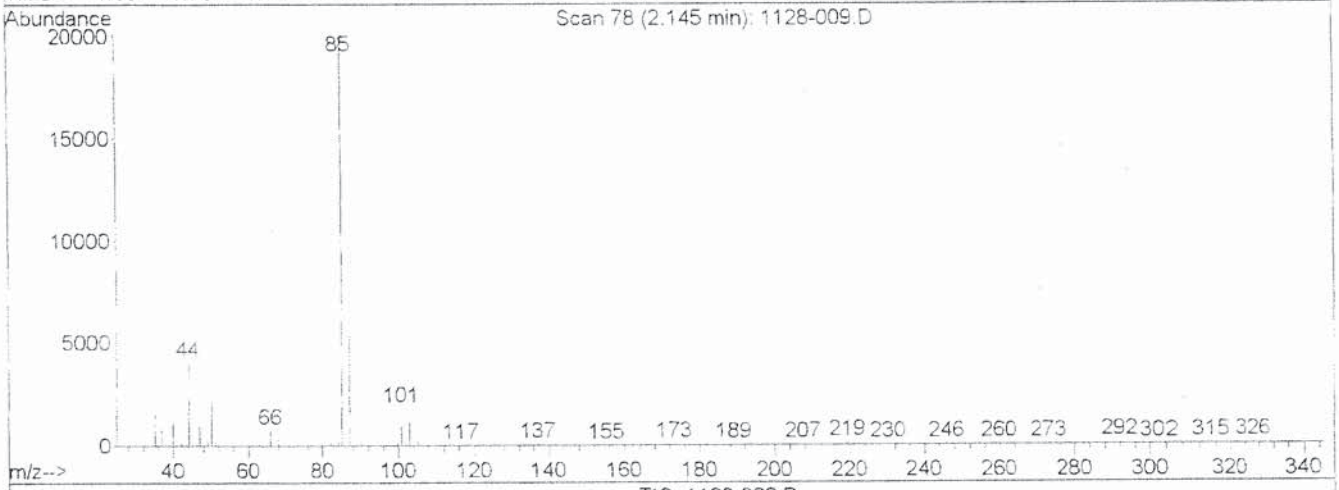


Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 28 18:14 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(2) Dichlorodifluoromethane (T)

2.14min 4.73ug/L

response 37912

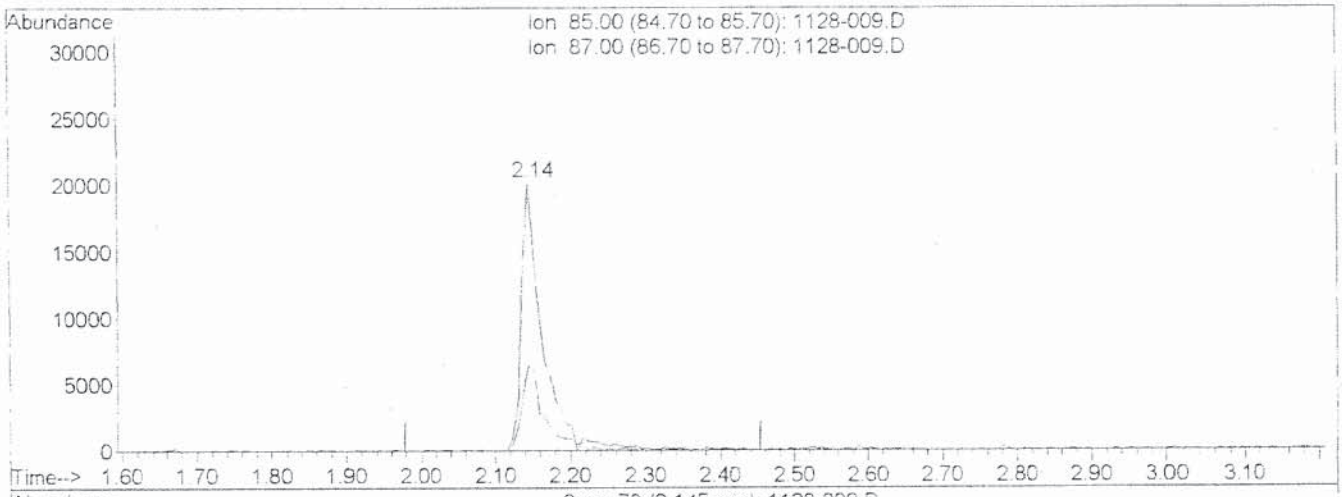
Ion	Exp%	Act%
85.00	100	100
87.00	32.40	36.24
0.00	0.00	0.00
0.00	0.00	0.00

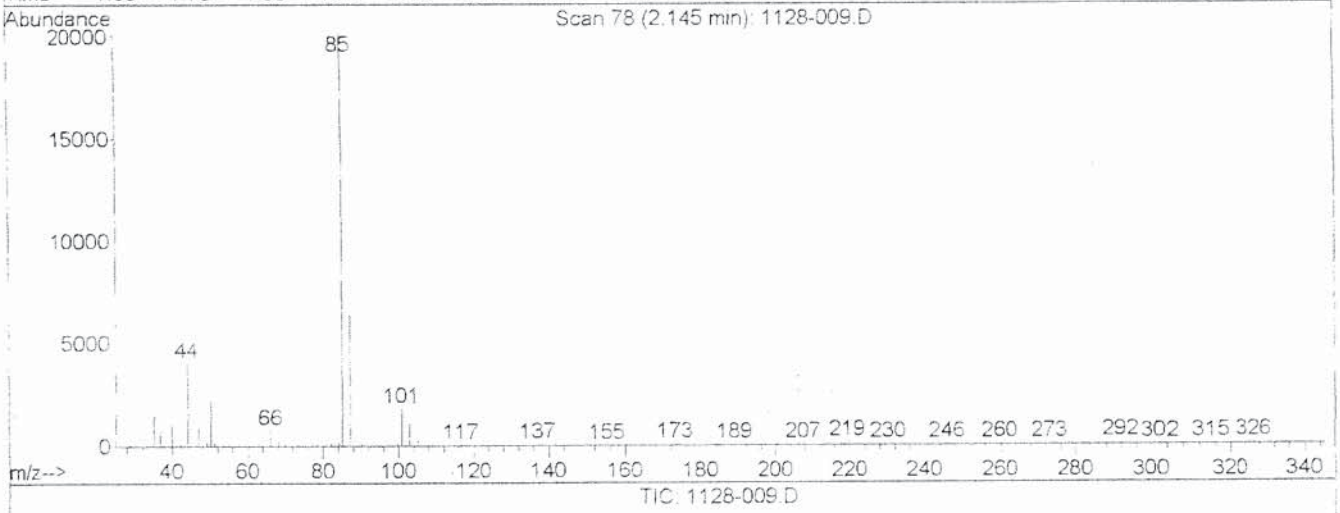
JJG

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:47 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(2) Dichlorodifluoromethane (T)

2.14min 5.03ug/L m

response 40377

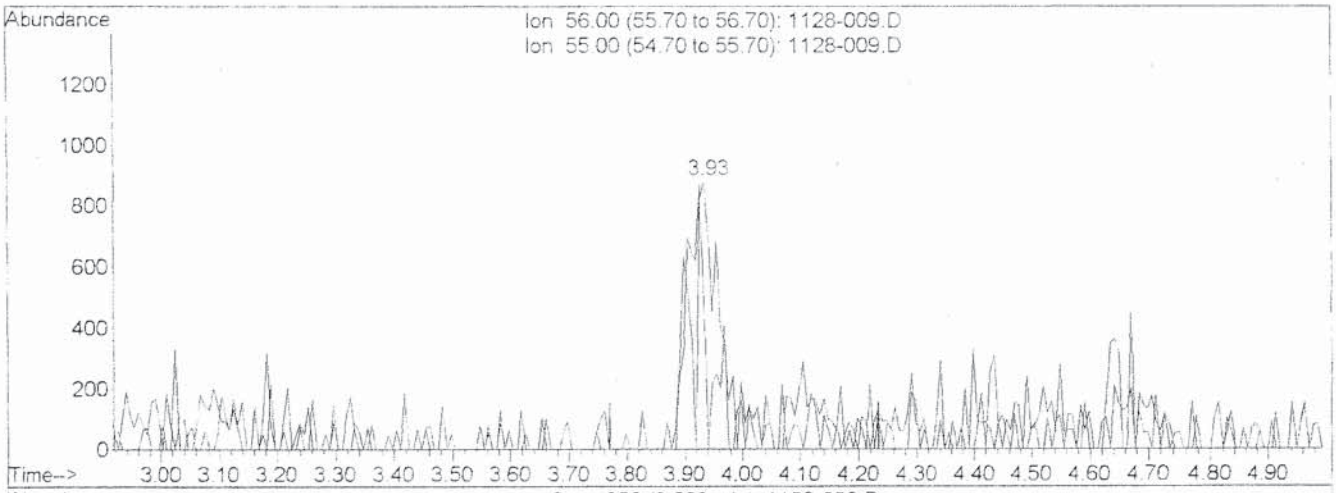
Ion	Exp%	Act%
85.00	100	100
87.00	32.40	34.03
0.00	0.00	0.00
0.00	0.00	0.00

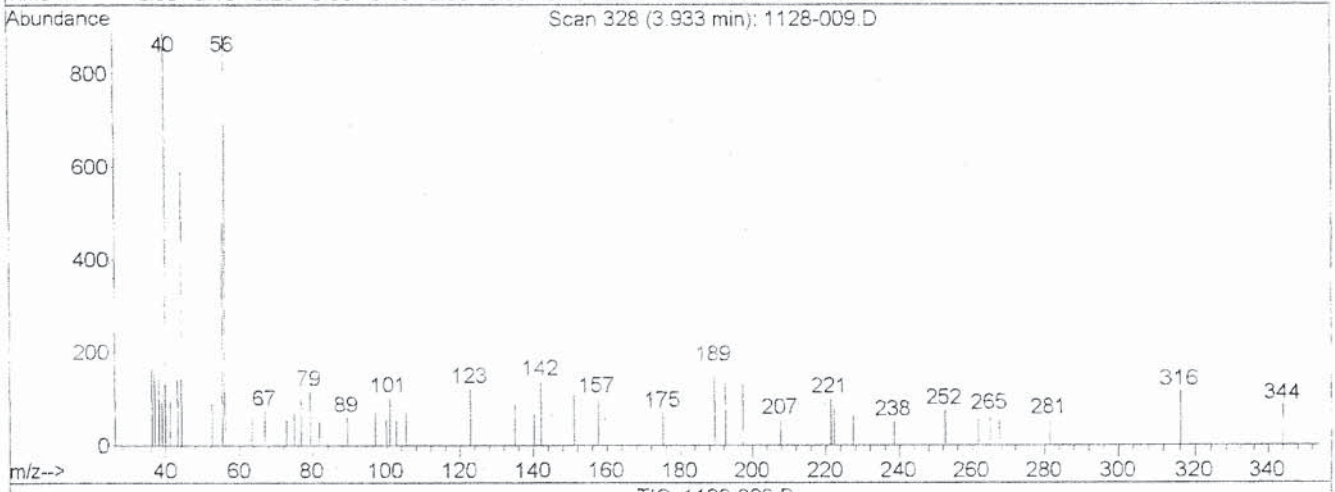
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DJG
DATE 1/6/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:47 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(8) Acrolein (T)

3.93min -1.00ug/L

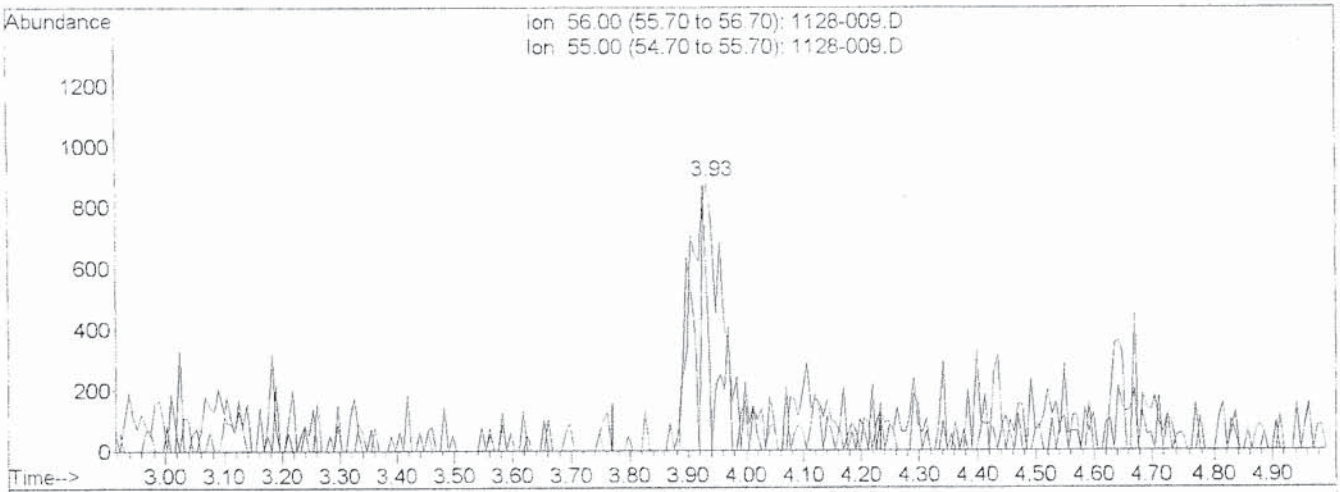
response 2023

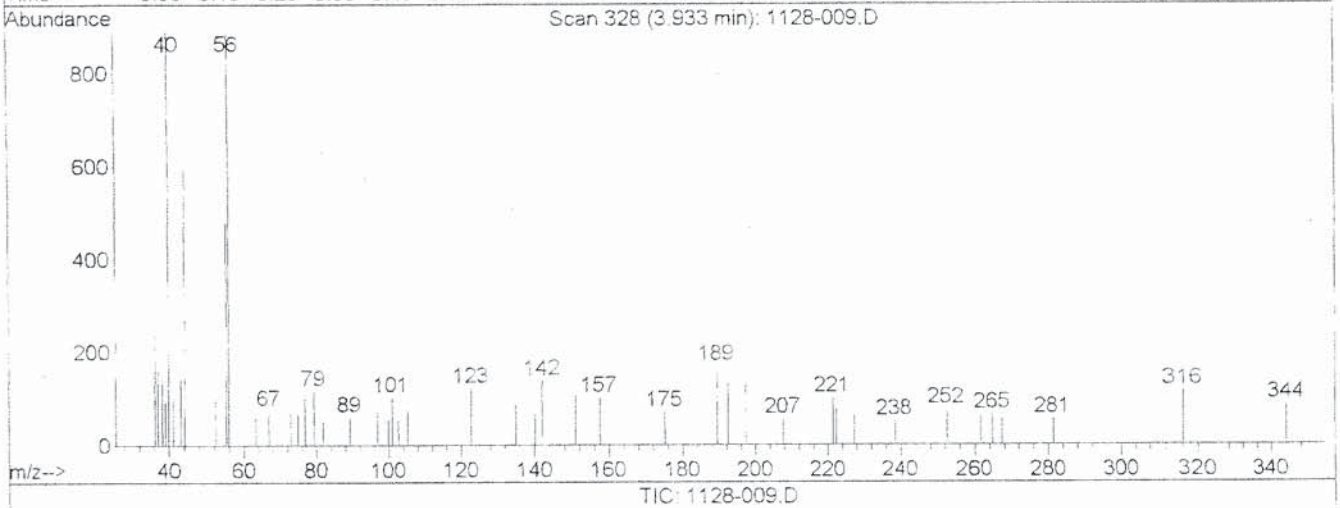
Ion	Exp%	Act%
56.00	100	100
55.00	72.90	84.68
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:48 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(8) Acrolein (T)

3.93min -1.00ug/L m

response 3273

Ion	Exp%	Act%
56.00	100	100
55.00	72.90	52.34#
0.00	0.00	0.00
0.00	0.00	0.00

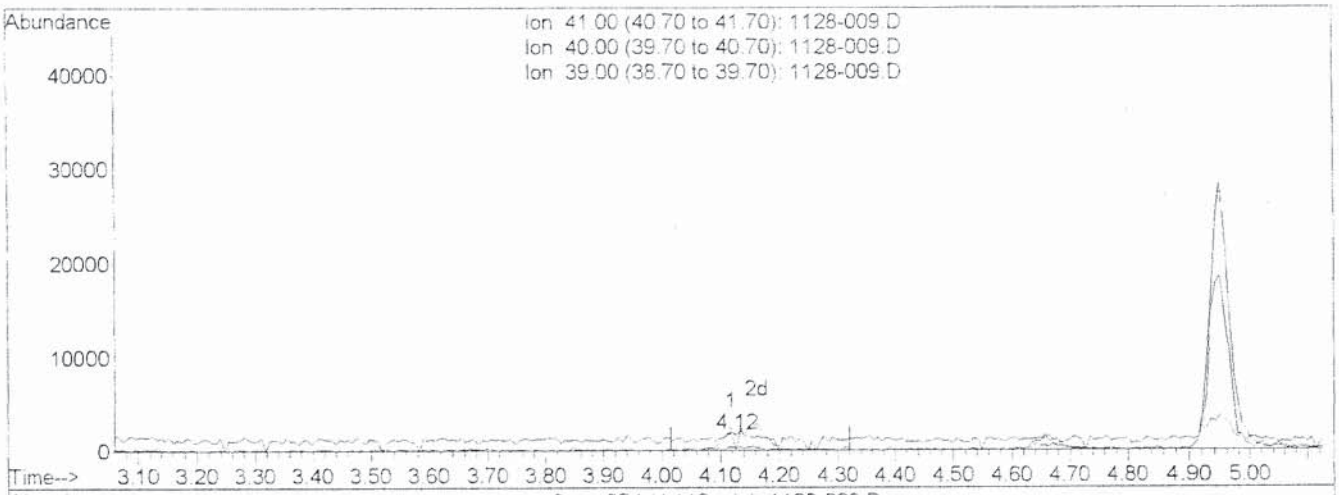
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2.) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JDU
DATE 12/2/15

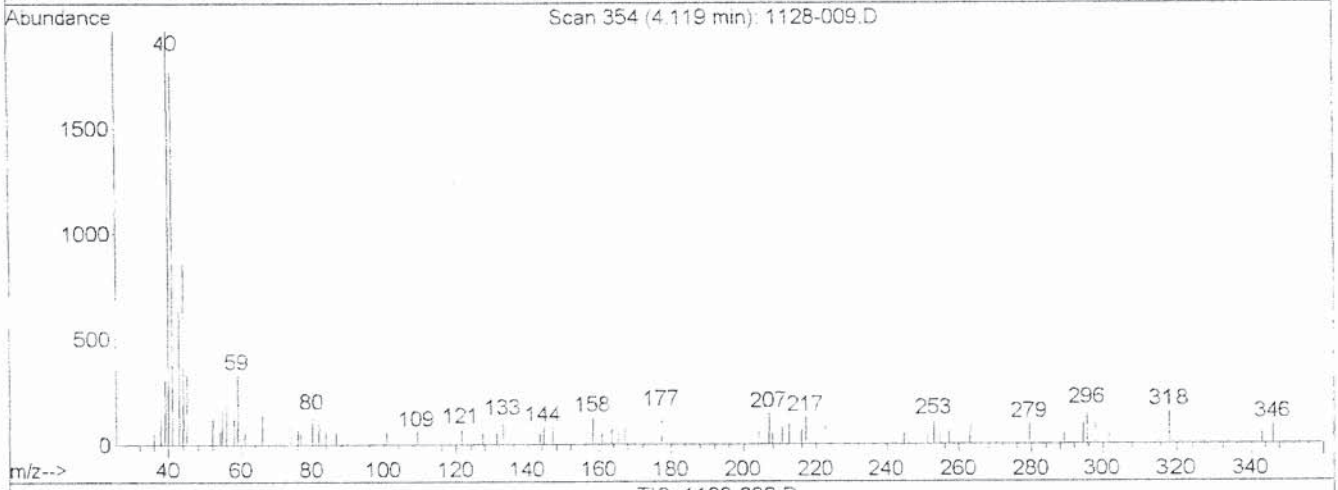
1128-009.D 141118W.M Sun Nov 30 12:48:06 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:48 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(9) Acetonitrile (T)

4.12min 1.17ug/L

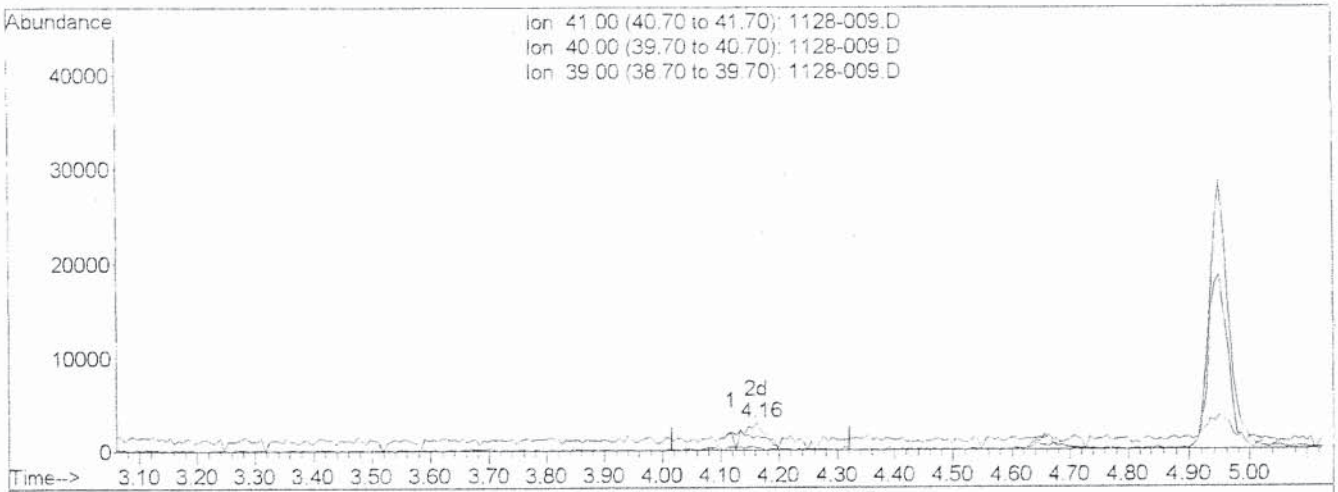
response 2655

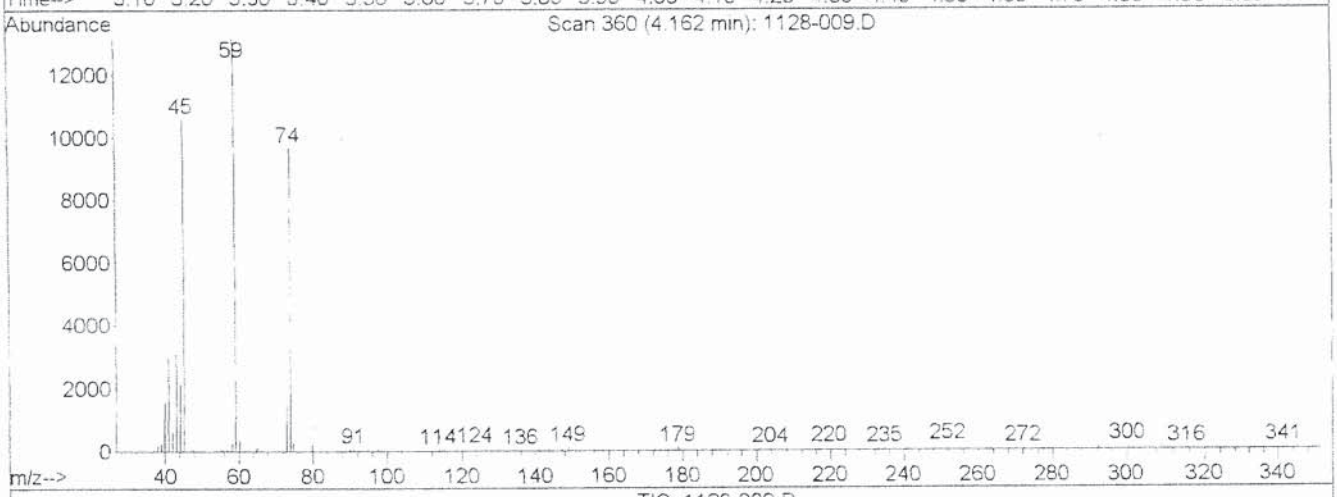
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	51.79
39.00	15.40	0.00#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:48 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(9) Acetonitrile (T)

4.16min 11.91ug/L m

response 10307

Ion	Exp%	Act%
41.00	100	100
40.00	49.00	13.34#
39.00	15.40	0.00#
0.00	0.00	0.00

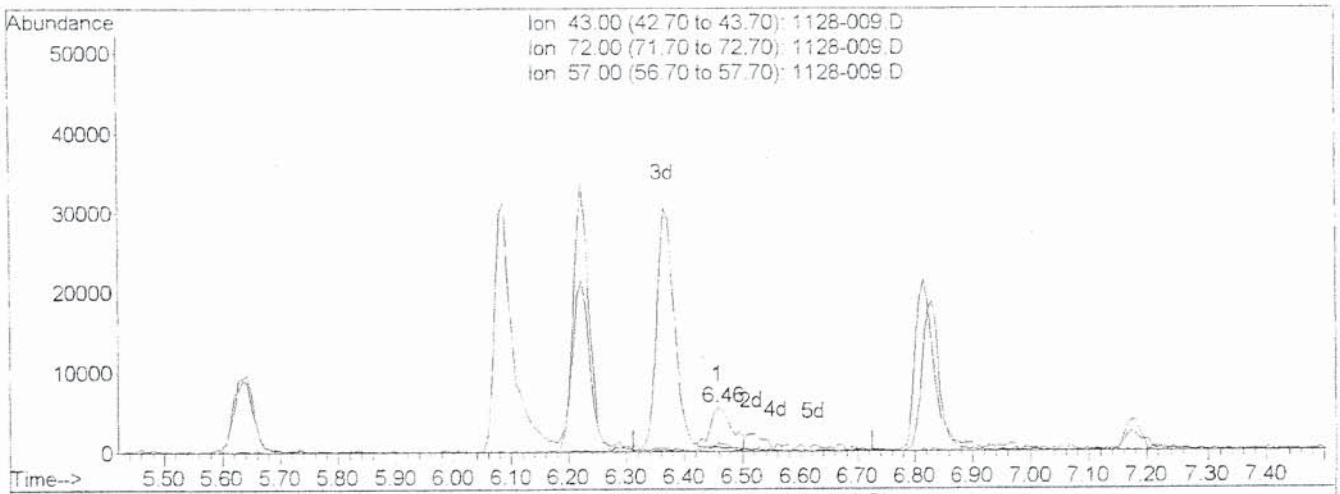
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 1/6/15

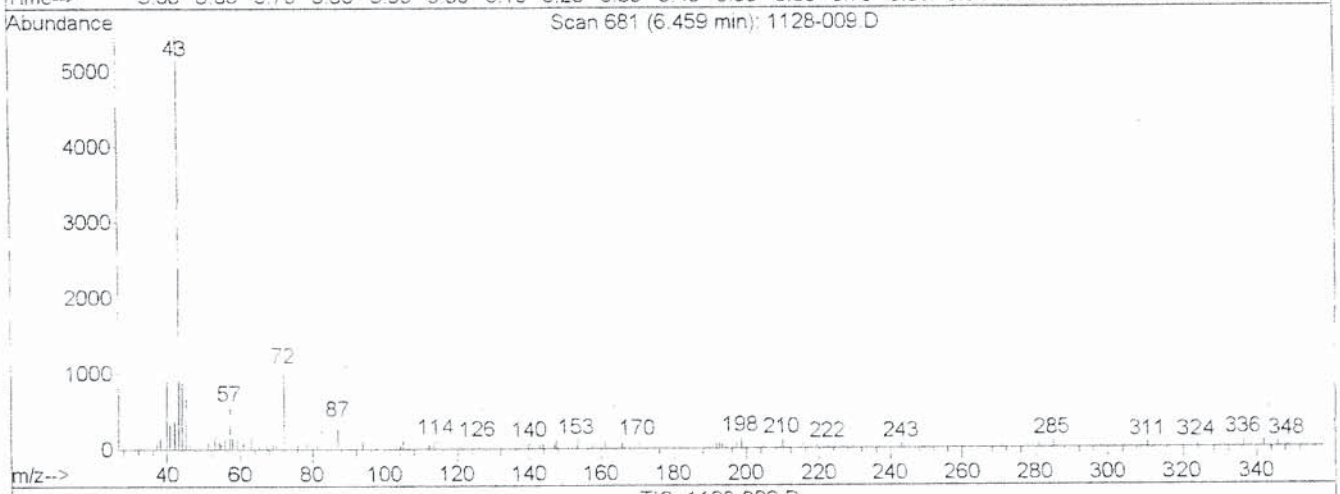
1128-009.D 141118W.M Sun Nov 30 12:48:16 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:48 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(29) 2-Butanone (MEK) (T)

6.46min 3.28ug/L

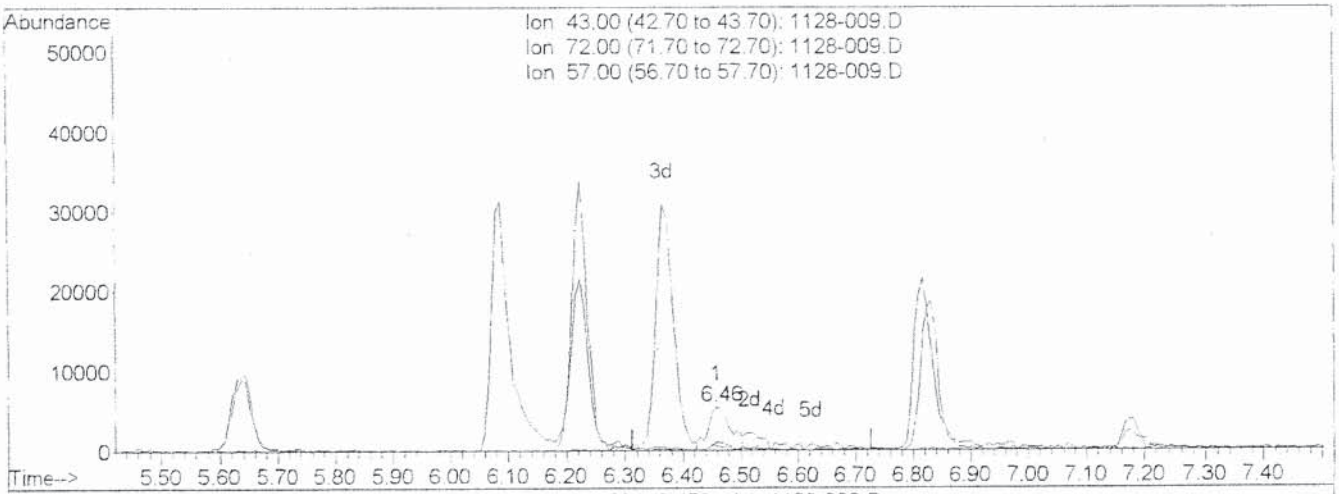
response 12605

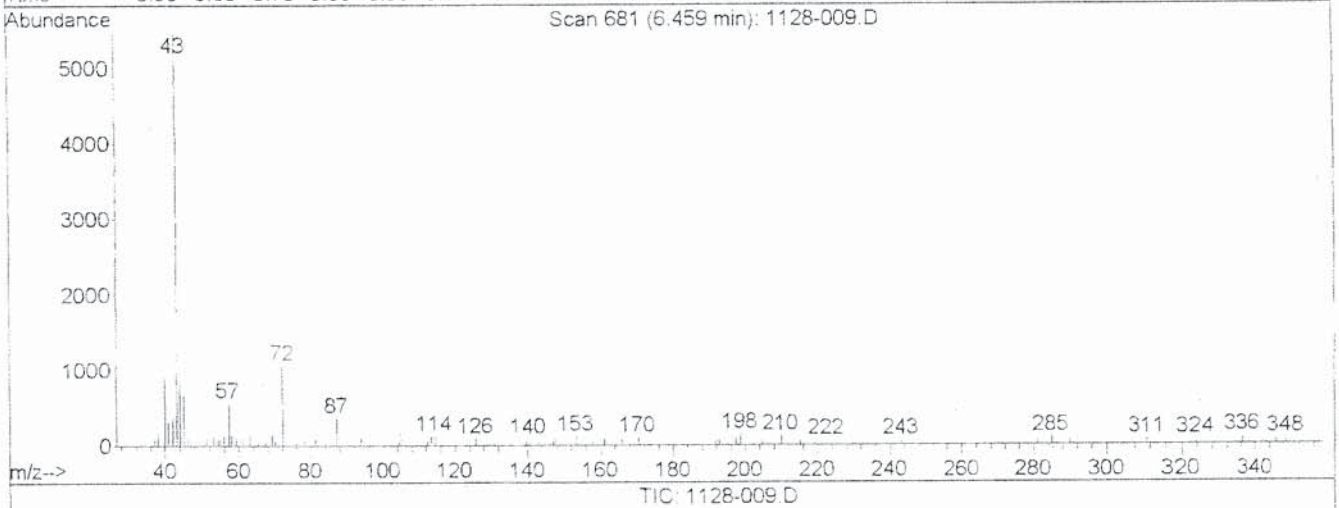
Ion	Exp%	Act%
43.00	100	100
72.00	18.70	17.62
57.00	7.50	8.52
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:48 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(29) 2-Butanone (MEK) (T)

6.46min 3.93ug/L m

response 15076

Ion	Exp%	Act%
43.00	100	100
72.00	18.70	14.73#
57.00	7.50	7.12
0.00	0.00	0.00

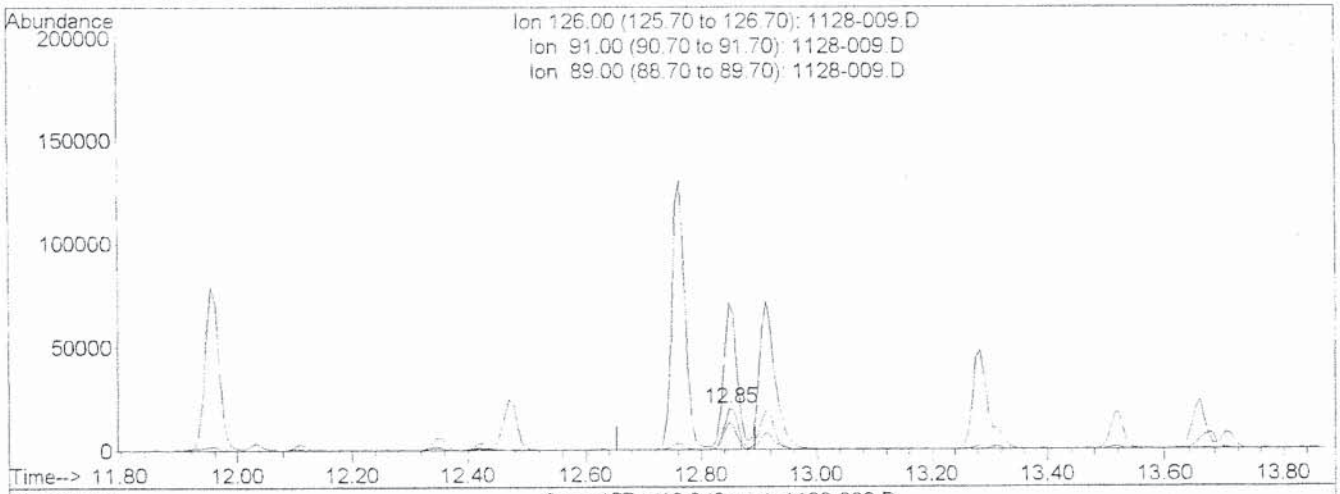
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST SDU
DATE 1/6/15

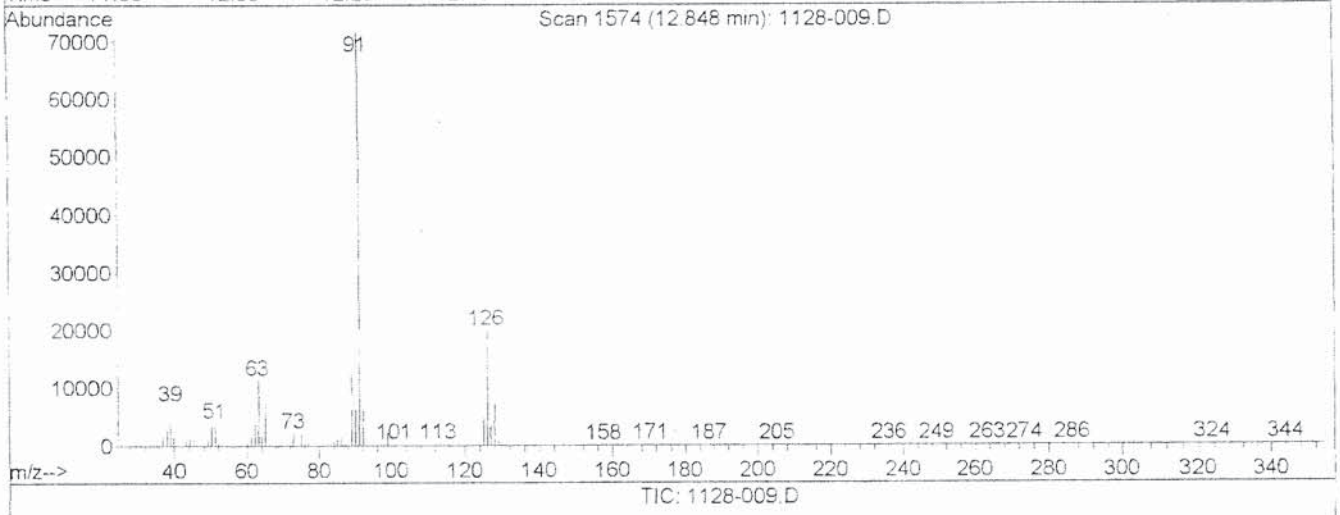
1128-009.D 141118W.M Sun Nov 30 12:48:44 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:48 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(91) 2-Chlorotoluene (T)

12.85min 5.31ug/L

response 33007

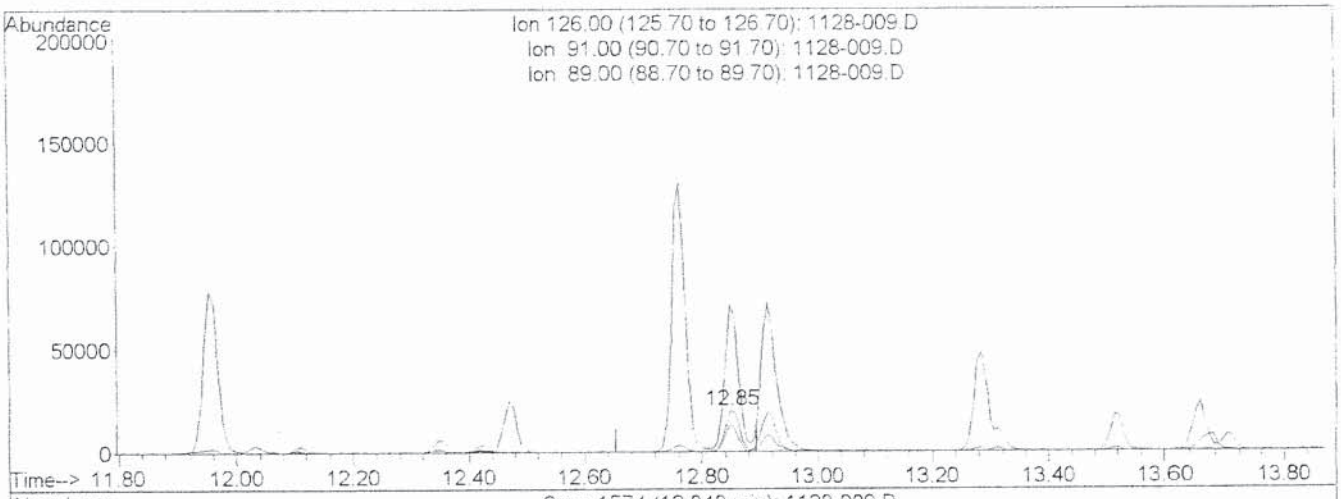
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	327.06
89.00	59.80	62.25
0.00	0.00	0.00

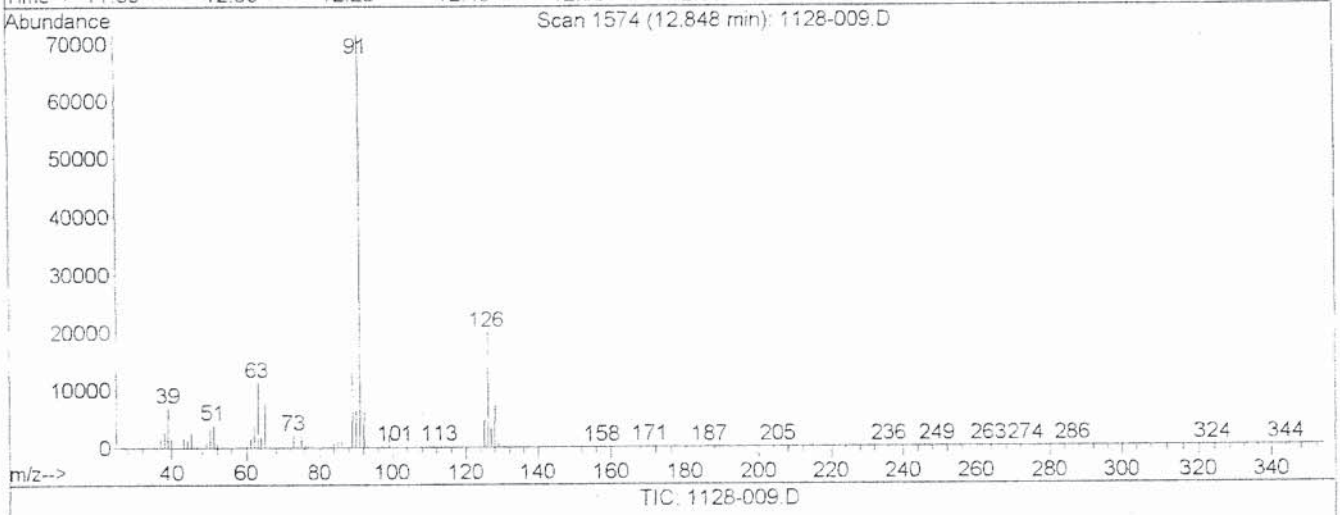
AJJa

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:49 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(91) 2-Chlorotoluene (T)

12.85min 5.48ug/L m

response 34073

Ion	Exp%	Act%
126.00	100	100
91.00	355.90	316.83
89.00	59.80	60.30
0.00	0.00	0.00

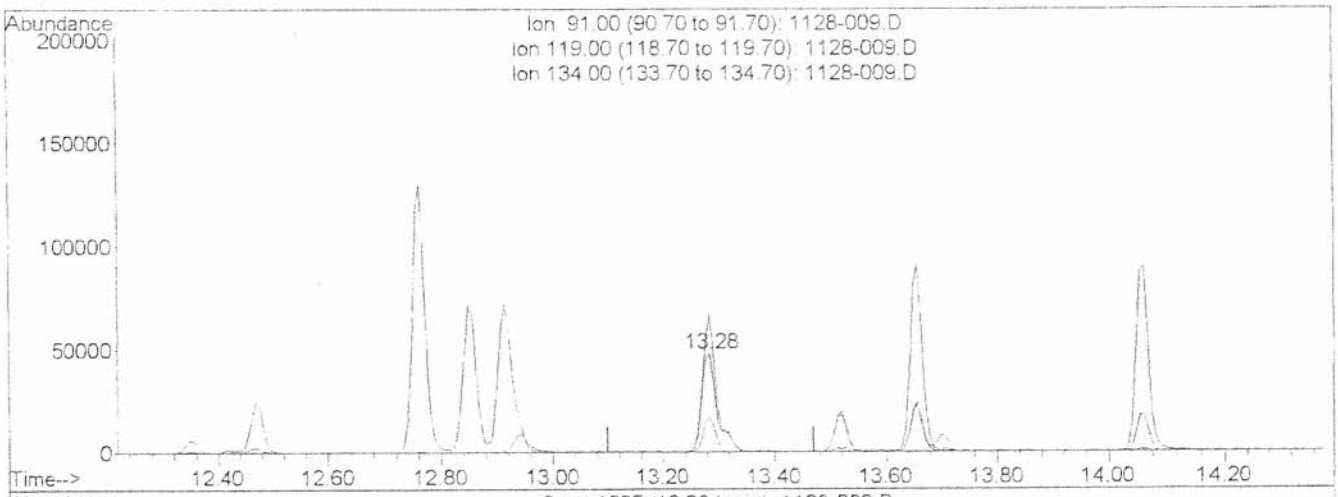
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2.) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 1/6/15

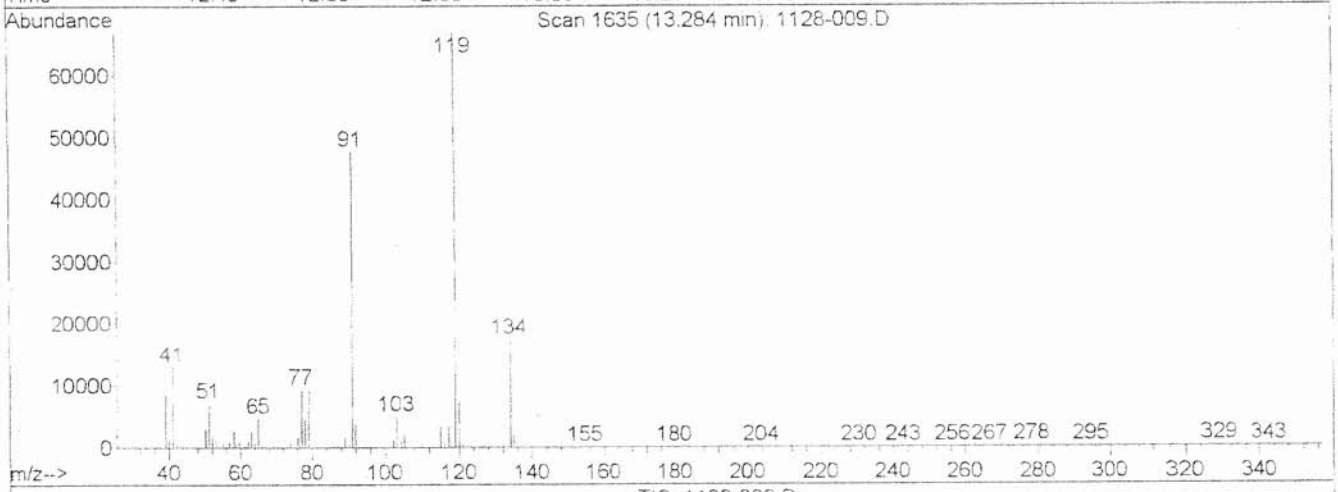
1128-009.D 141118W.M Sun Nov 30 12:49:50 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:49 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(94) tert-Butylbenzene (T)

13.28min 4.71ug/L

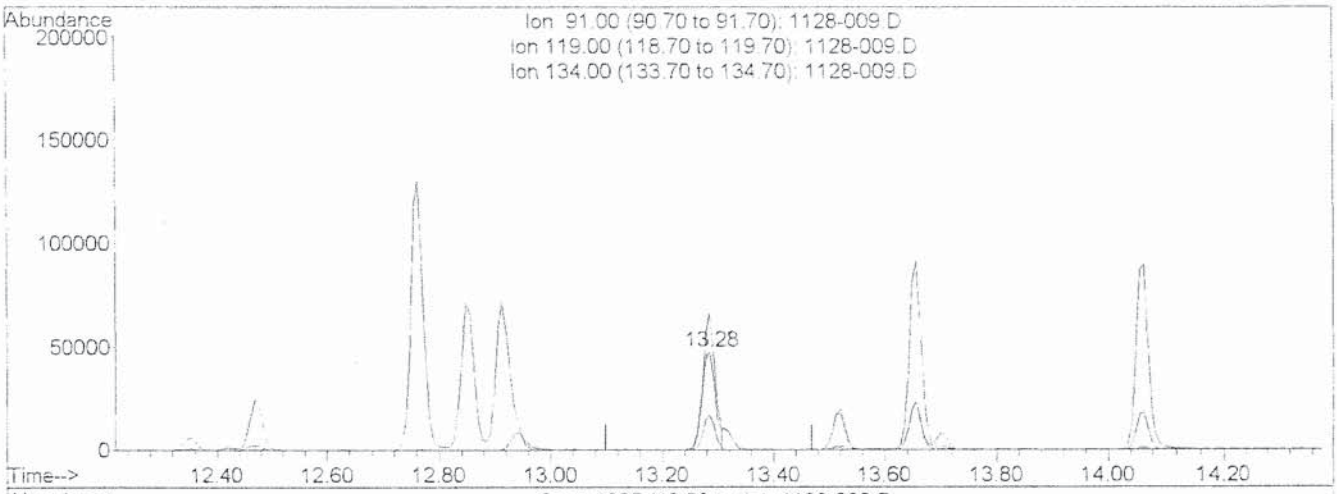
response 90465

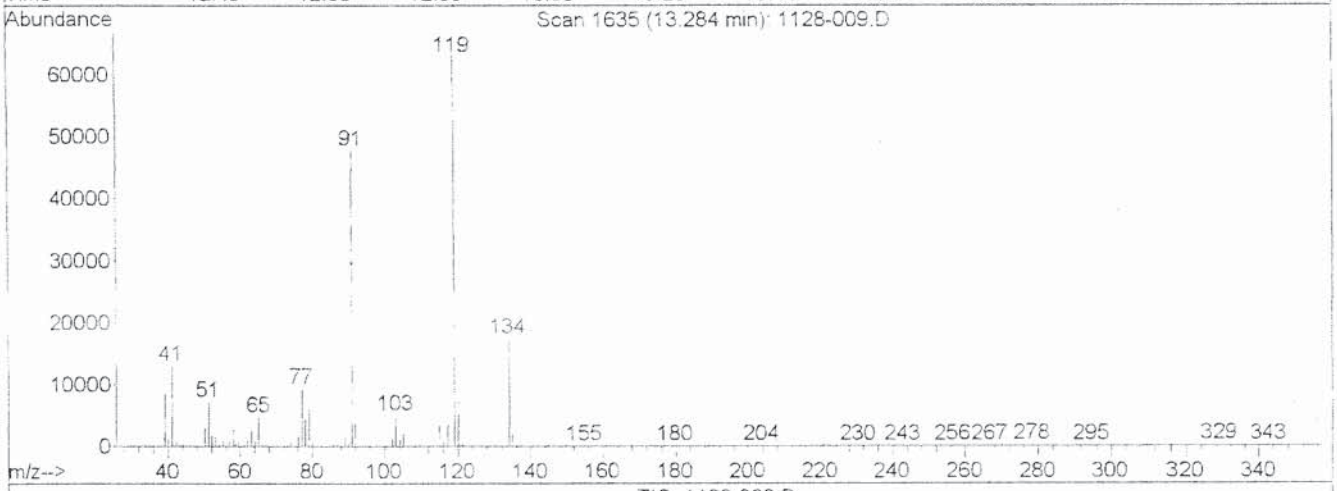
Ion	Exp%	Act%
91.00	100	100
119.00	136.80	126.24
134.00	31.60	28.35
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-009.D Vial: 9
Acq On : 28 Nov 2014 5:57 pm Operator: JDB
Sample : ICAL2 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:50 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-009.D

(94) tert-Butylbenzene (T)

13.28min 4.12ug/L m

response 78991

Ion	Exp%	Act%
91.00	100	100
119.00	136.80	144.57
134.00	31.60	32.47
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 12/6/15

1128-009.D 141118W.M Sun Nov 30 12:49:59 2014

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:54 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Fluorobenzene	8.15	96	885825	50.00 ug/L	0.00
56) Chlorobenzene-d5	11.27	82	433872	50.00 ug/L	0.00
84) 1,4-Dichlorobenzene-d4	13.67	152	330211	50.00 ug/L	0.00
System Monitoring Compounds					
37) Dibromofluoromethane	7.13	111	198803	51.10 ug/L	0.00
Spiked Amount 50.000	Range 86 - 112		Recovery = 102.20%		
41) 1,2-Dichloroethane-d4	7.62	65	267787	45.73 ug/L	0.00
Spiked Amount 50.000	Range 72 - 121		Recovery = 91.46%		
65) Toluene-d8	9.84	98	971017	55.06 ug/L	0.00
Spiked Amount 50.000	Range 88 - 115		Recovery = 110.12%		
87) 4-Bromofluorobenzene	12.46	95	339709	42.43 ug/L	0.00
Spiked Amount 50.000	Range 86 - 113		Recovery = 84.86%#		
Target Compounds					Qvalue
2) Dichlorodifluoromethane	2.14	85	91484m	11.05 ug/L	
3) Chloromethane (P)	2.38	50	64130	6.33 ug/L	95
4) Vinyl Chloride (C)	2.52	62	90626	10.90 ug/L	96
5) Bromomethane	3.01	96	17313	12.50 ug/L	95
6) Chloroethane	3.15	64	83282	14.81 ug/L	94
7) 1,2-Dichlorotrifluoroethan	3.71	67	98187	11.79 ug/L	97
8) Acrolein	3.92	56	10373m	Below Cal	
9) Acetonitrile	4.16	41	22720	28.35 ug/L #	57
10) Trichlorofluoromethane	3.70	101	96139	10.93 ug/L	98
11) Acetone	4.04	43	24088	9.58 ug/L #	72
12) Diethyl Ether	4.16	59	65866	9.93 ug/L	97
13) 1,1-Dichloroethene (C)	4.52	61	105536	11.20 ug/L	99
14) tert-Butyl Alcohol	4.66	59	28328	42.30 ug/L #	85
15) Iodomethane	4.71	142	31814	6.65 ug/L	96
16) Acrylonitrile	4.87	53	29315	12.45 ug/L	99
17) Methylene Chloride	4.99	84	70620	10.78 ug/L	98
18) Methyl Acetate	4.86	43	67935	9.66 ug/L	97
19) Allyl Chloride	4.95	41	124151	9.92 ug/L #	97
20) 1,1,2-Trichlorotrifluoroet	4.60	101	57132	14.51 ug/L	93
21) Carbon Disulfide	5.06	76	210596	11.16 ug/L	99
22) trans-1,2-Dichloroethene	5.65	61	102716	10.34 ug/L	100
23) Methyl tert-Butyl Ether	5.64	73	188386	9.03 ug/L	97
24) 1,1-Dichloroethane (P)	6.02	63	136952	10.71 ug/L	100
25) Propionitrile	6.19	54	9372	17.22 ug/L #	1
26) Vinyl Acetate	6.08	43	157134	8.50 ug/L	98
27) Chloroprene	6.28	53	122025	9.17 ug/L	96
28) Hexane	6.22	57	158936	11.38 ug/L	97

(#) = qualifier out of range (m) = manual integration
1128-010.D 141118W.M Sun Nov 30 12:54:55 2014 Page 1

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:54 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
29)	2-Butanone (MEK)	6.45	43	31827m	8.04	ug/L		
30)	Diisopropyl Ether	6.37	45	284048	10.05	ug/L		97
31)	Methacrylonitrile	6.62	67	31231	9.77	ug/L		91
32)	cis-1,2-Dichloroethene	6.72	61	101222	10.22	ug/L		95
33)	Ethyl Acetate	6.81	70	7152	7.85	ug/L	#	26
34)	Bromochloromethane	6.99	130	37208	10.96	ug/L		94
35)	Chloroform (C)	6.97	83	114867	10.32	ug/L		97
36)	2,2-Dichloropropane	6.82	77	84193	8.74	ug/L	#	86
38)	tert-Butyl Ethyl Ether	6.82	59	243270	9.39	ug/L	#	88
39)	Isobutyl Alcohol	7.06	43	1291	8.92	ug/L	#	41
40)	Tetrahydrofuran	7.17	72	18644	20.22	ug/L		89
42)	1,2-Dichloroethane	7.72	62	96070	9.81	ug/L	#	82
43)	1,1,1-Trichloroethane	7.52	97	87089	13.75	ug/L		97
44)	1,1-Dichloropropene	7.74	75	95035	13.87	ug/L		99
45)	Cyclohexane	7.80	56	172565	11.29	ug/L		99
46)	Isopropyl Acetate	7.80	43	173957	9.63	ug/L		98
47)	Carbon Tetrachloride	7.86	117	68874	14.65	ug/L		98
48)	Benzene	7.89	78	307413	11.17	ug/L		98
49)	tert-Amyl Methyl Ether	8.07	43	78517	9.33	ug/L		99
50)	Dibromomethane	8.81	93	40668	16.45	ug/L		92
51)	1,2-Dichloropropane (C)	8.69	63	86958	10.69	ug/L		96
52)	2-Nitropropane	8.94	43	65480	9.70	ug/L	#	86
53)	Trichloroethene	8.65	130	61103	17.32	ug/L		93
54)	Bromodichloromethane	8.86	83	98058	10.67	ug/L		97
55)	1,4-Dioxane	8.86	88	1201m	13.46	ug/L		
57)	Methyl Methacrylate	8.81	69	56732	9.81	ug/L	#	76
58)	n-Propyl Acetate	8.83	43	118041	9.81	ug/L		94
59)	Methyl Cyclohexane	9.02	83	168306	12.17	ug/L		97
60)	2-Chloroethyl Vinyl Ether	9.21	63	53982	10.48	ug/L	#	92
61)	cis-1,3-Dichloropropene	9.44	75	120664	10.56	ug/L	#	89
62)	4-Methyl-2-pentanone (MIBK	9.36	43	77490	9.79	ug/L		96
63)	trans-1,3-Dichloropropene	9.91	75	108469	9.80	ug/L		94
64)	1,1,2-Trichloroethane	10.06	83	58927	10.98	ug/L		95
66)	Toluene (C)	9.91	92	186063	11.15	ug/L		99
67)	1,3-Dichloropropane	10.27	76	123566	11.10	ug/L		99
68)	Ethyl Methacrylate	10.09	69	100948	9.99	ug/L	#	81
69)	2-Hexanone	10.20	43	52338	9.75	ug/L		98
70)	Dibromochloromethane	10.54	129	64057	10.91	ug/L		96
71)	1,2-Dibromoethane (EDB)	10.75	107	58524	10.76	ug/L	#	95
72)	Tetrachloroethene	10.65	164	44733	15.90	ug/L		97
73)	1,1,1,2-Tetrachloroethane	11.35	131	55177	10.44	ug/L		95

(#) = qualifier out of range (m) = manual integration

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:54 2014 Quant Results File: 141118W.RES

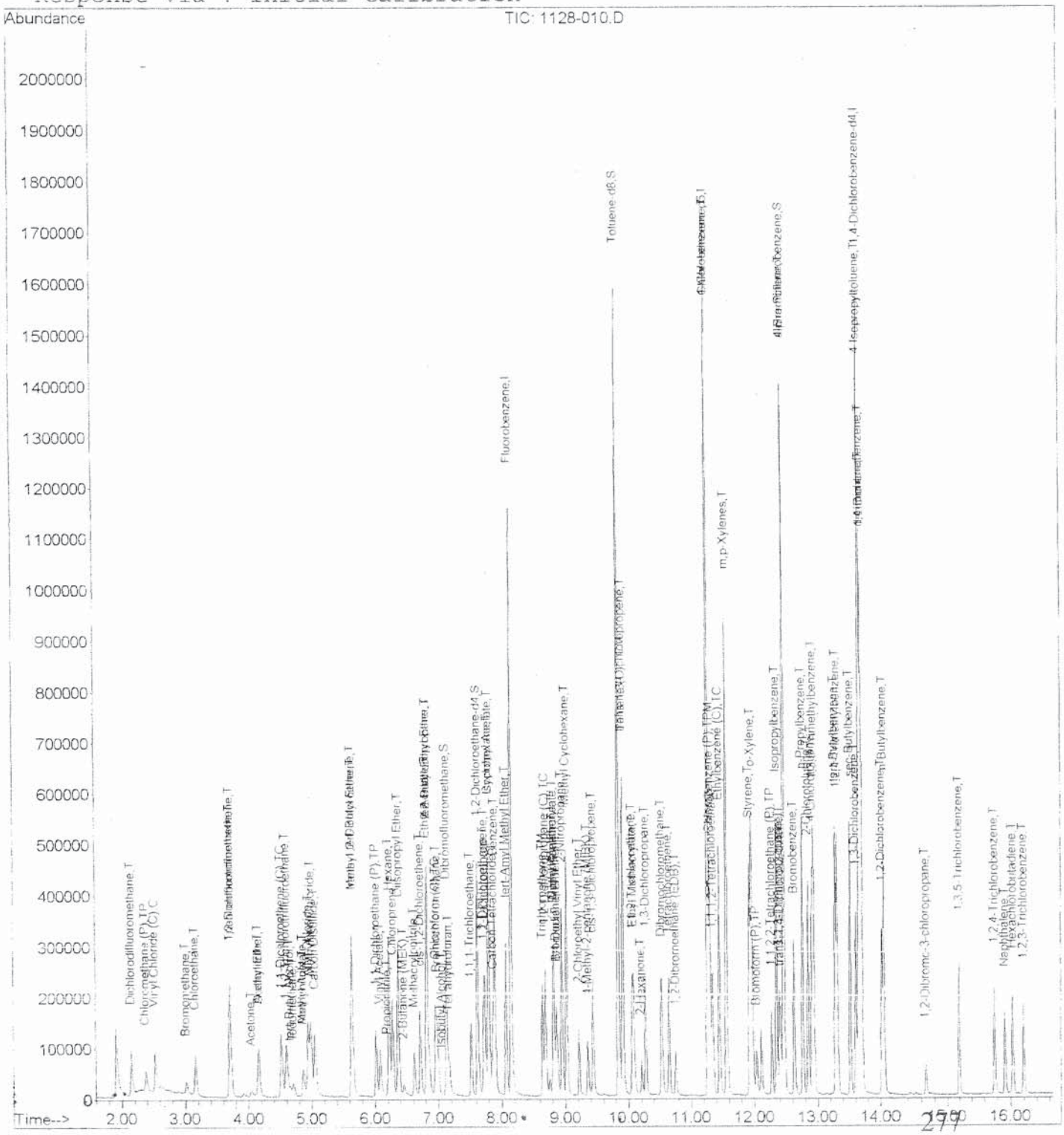
Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

	Compound	R.T.	QIon	Response	Conc Unit		Qvalue
74)	1-Chlorohexane	11.26	91	127700	11.84 ug/L		100
75)	Chlorobenzene (P)	11.30	112	189969	11.55 ug/L		98
76)	Ethylbenzene (C)	11.45	106	102888	10.69 ug/L		99
77)	m,p-Xylenes	11.56	106	255447	23.52 ug/L		97
78)	Bromoform (P)	12.03	173	34464	9.96 ug/L		98
79)	Cyclohexanone	12.09	55	4566	Below Cal	#	50
80)	Styrene	11.92	104	208611	10.60 ug/L		89
81)	1,1,2,2-Tetrachloroethane	12.27	83	89291	11.41 ug/L		100
82)	o-Xylene	11.95	106	126921	13.63 ug/L	#	96
83)	1,2,3-Trichloropropane	12.40	110	24509	11.50 ug/L		83
85)	trans-1,4-Dichloro-2-buten	12.42	53	27337	9.28 ug/L	#	1
86)	Isopropylbenzene	12.35	120	83173	10.05 ug/L		97
88)	alpha-Pinene	12.47	93	202438	10.24 ug/L		98
89)	Bromobenzene	12.63	77	143665	10.02 ug/L	#	88
90)	n-Propylbenzene	12.76	120	90281	10.23 ug/L		84
91)	2-Chlorotoluene	12.85	126	70324m	10.71 ug/L		
92)	4-Chlorotoluene	12.91	126	73642	9.98 ug/L	#	84
93)	1,3,5-Trimethylbenzene	12.94	120	130172	9.98 ug/L		100
94)	tert-Butylbenzene	13.28	91	166287m	8.21 ug/L		
95)	1,2,4-Trimethylbenzene	13.31	120	143008	9.72 ug/L	#	76
96)	sec-Butylbenzene	13.52	134	66206	9.76 ug/L		96
97)	1,3-Dichlorobenzene	13.61	146	130034	9.86 ug/L		96
98)	d-Limonene	13.70	68	143204	9.76 ug/L		97
99)	1,4-Dichlorobenzene	13.70	146	138987	9.77 ug/L		99
100)	4-Isopropyltoluene	13.66	134	75066	9.60 ug/L		97
101)	1,2-Dichlorobenzene	14.03	146	123222	9.85 ug/L		99
102)	n-Butylbenzene	14.06	92	165100	9.78 ug/L		98
103)	1,2-Dibromo-3-chloropropan	14.67	157	13442	10.06 ug/L		88
104)	1,3,5-Trichlorobenzene	15.19	180	76326	9.49 ug/L		96
105)	1,2,4-Trichlorobenzene	15.76	180	54406	8.68 ug/L		95
106)	Naphthalene	15.92	128	121885	8.98 ug/L		98
107)	Hexachlorobutadiene	16.03	225	31905	9.73 ug/L		95
108)	1,2,3-Trichlorobenzene	16.20	180	45995	10.29 ug/L		97

(#) = qualifier out of range (m) = manual integration

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:54 2014 Quant Results File: 141118W.RES

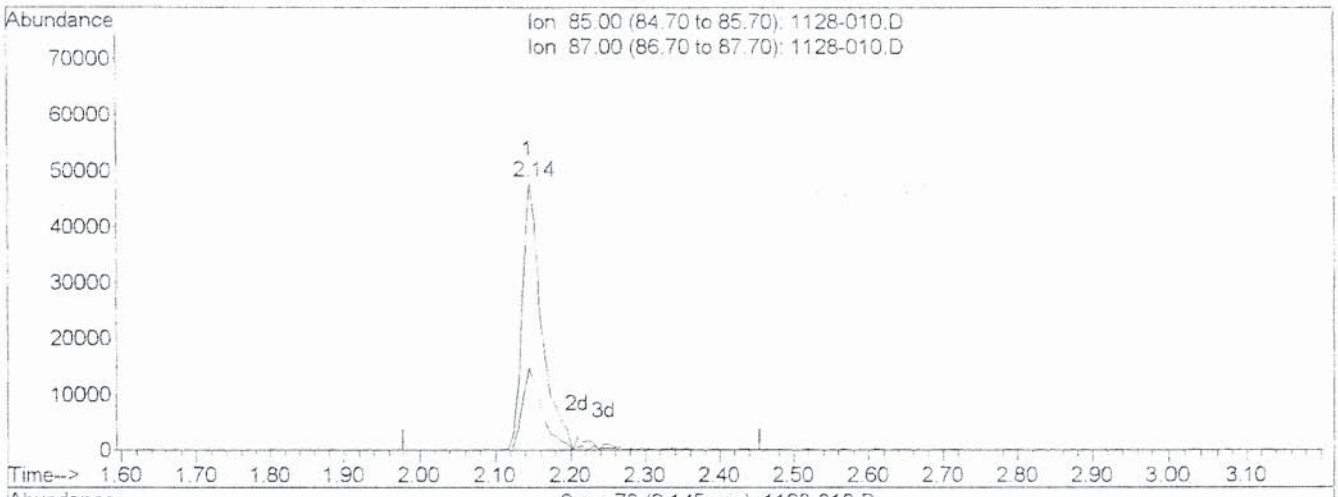
Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration

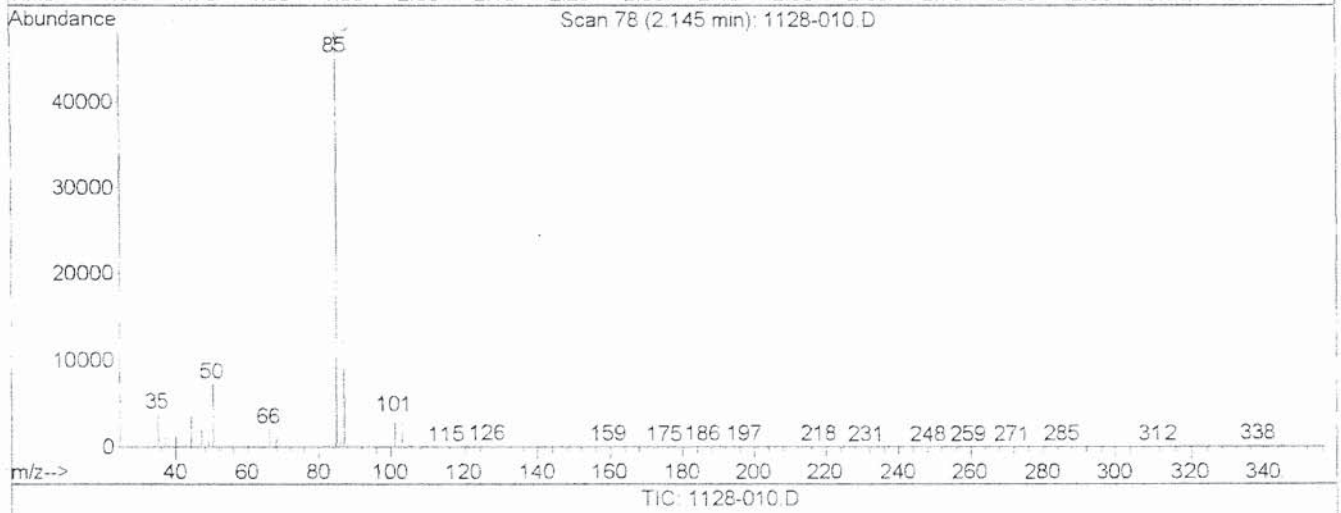


Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 28 18:41 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-010.D

(2) Dichlorodifluoromethane (T)

2.14min 10.53ug/L

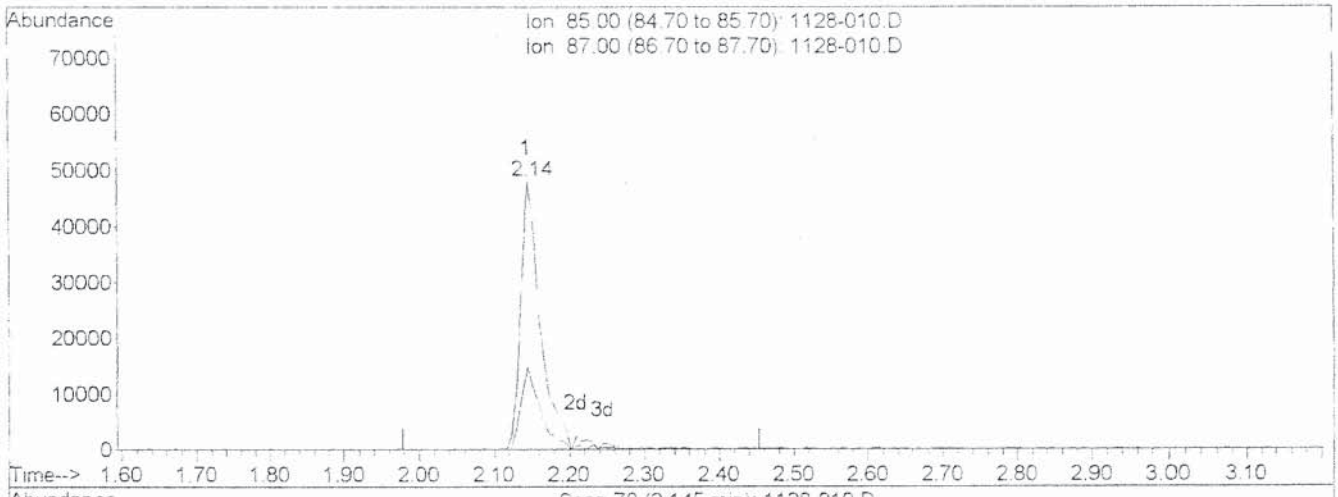
response 87109

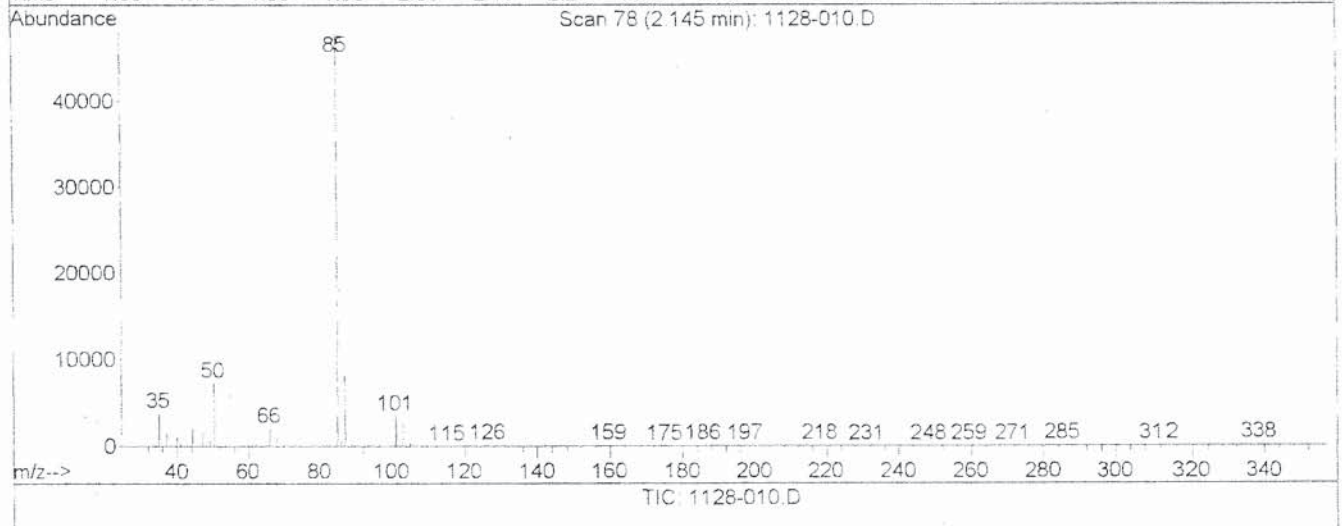
Ion	Exp%	Act%
85.00	100	100
87.00	32.40	30.94
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:52 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-010.D

(2) Dichlorodifluoromethane (T)

2.14min 11.05ug/L m

response 91484

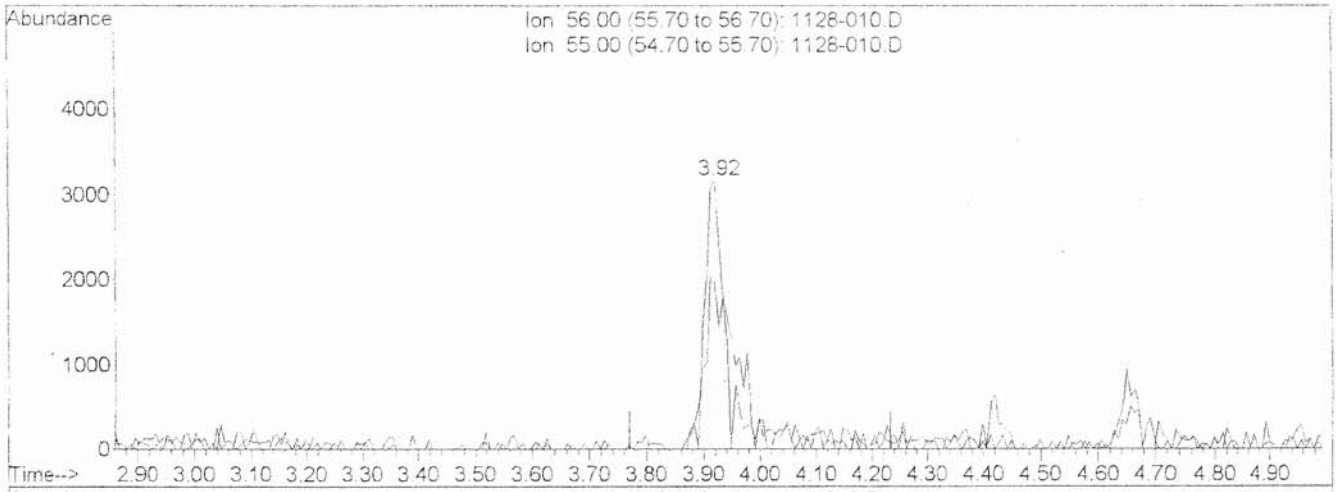
Ion	Exp%	Act%
85.00	100	100
87.00	32.40	29.46
0.00	0.00	0.00
0.00	0.00	0.00

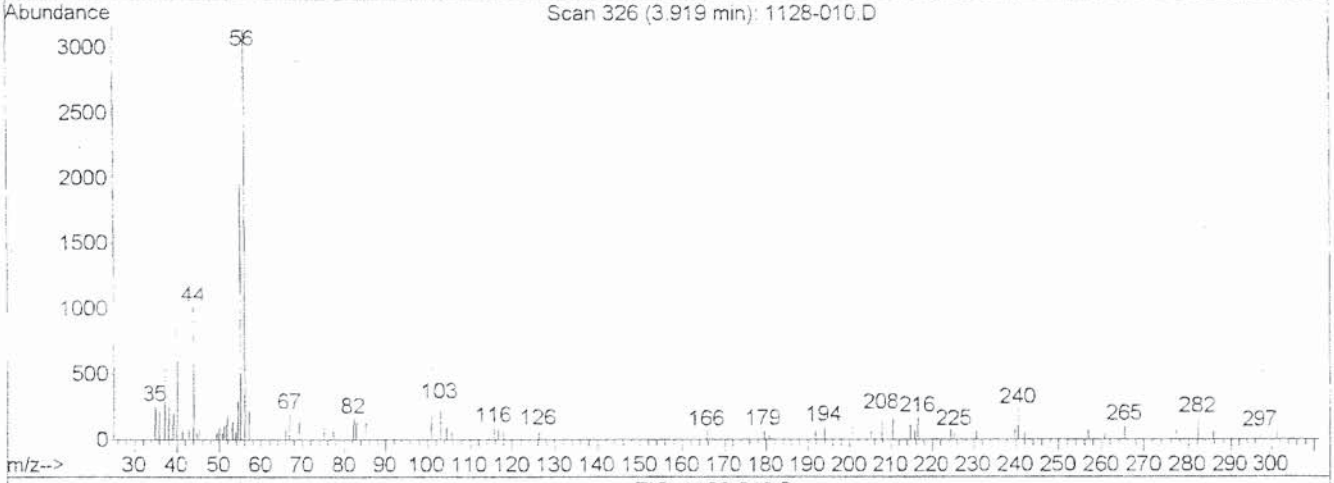
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DHQ
DATE 1/6/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:52 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-010.D

(8) Acrolein (T)

3.92min -1.00ug/L

response 9307

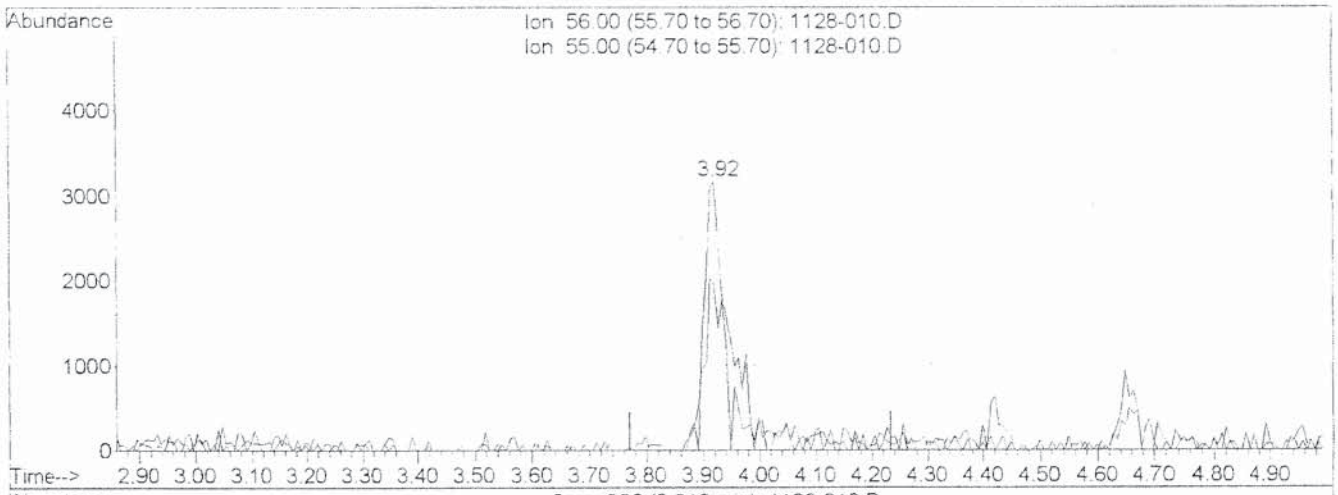
Ion	Exp%	Act%
56.00	100	100
55.00	72.90	63.27
0.00	0.00	0.00
0.00	0.00	0.00

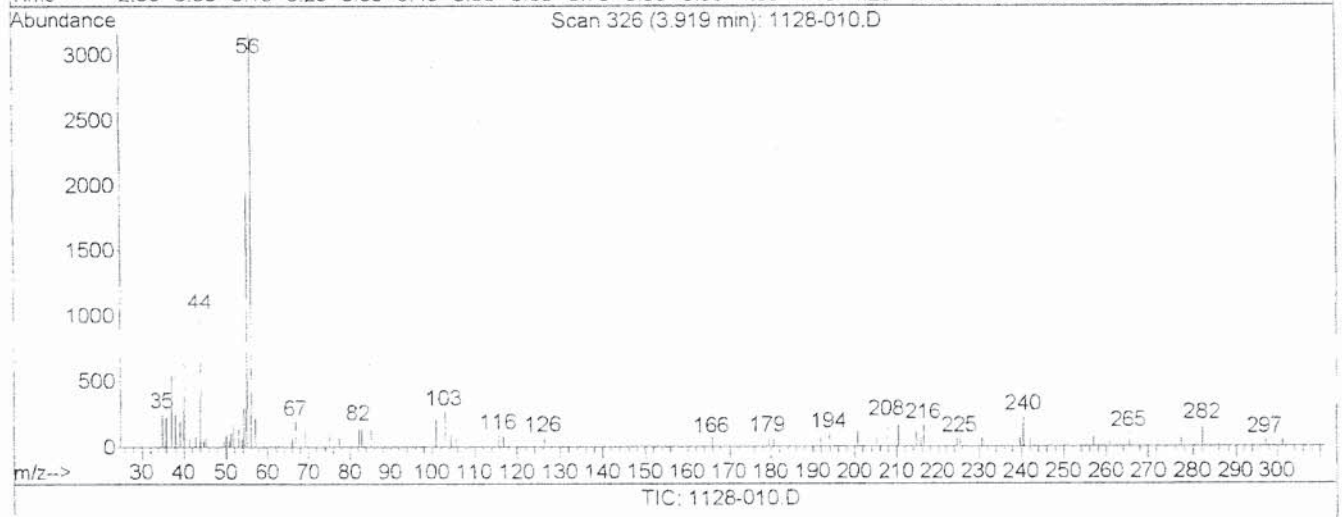
1128-010.D 141118W.M Sun Nov 30 12:53:05 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:53 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-010.D

(8) Acrolein (T)

3.92min -1.00ug/L m

response 10373

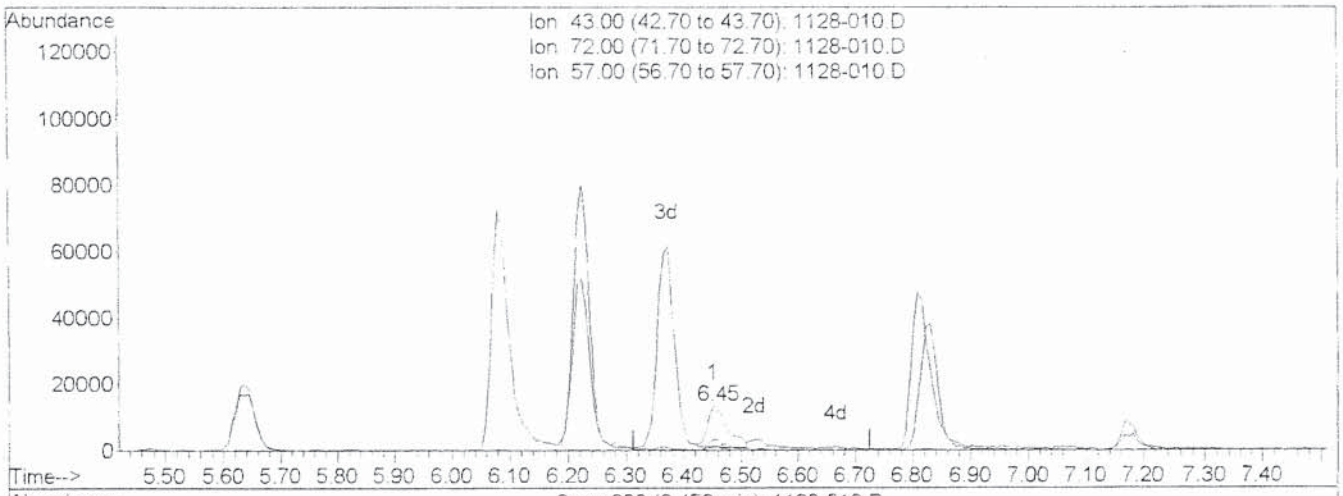
Ion	Exp%	Act%
56.00	100	100
55.00	72.90	56.77#
0.00	0.00	0.00
0.00	0.00	0.00

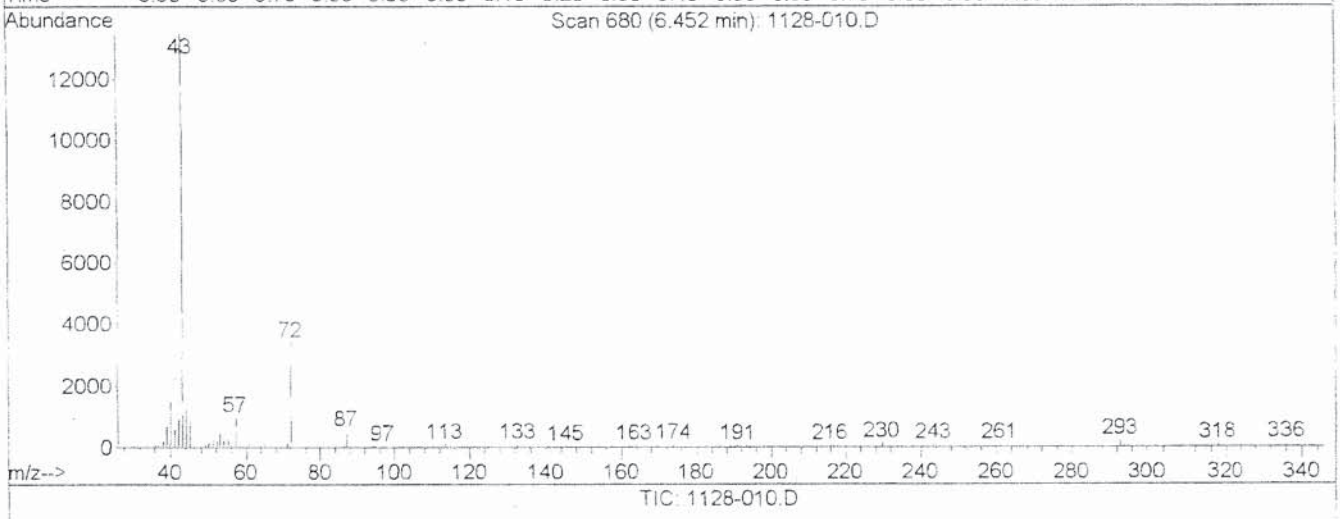
MANUAL EDIT CODES
1 WRONG PEAK SELECTED
(2) POOR INTEGRATION
3 PEAK NOT FOUND
4 OTHER
ANALYST
DATE 1/10/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:53 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-010.D

(29) 2-Butanone (MEK) (T)

6.45min 7.34ug/L

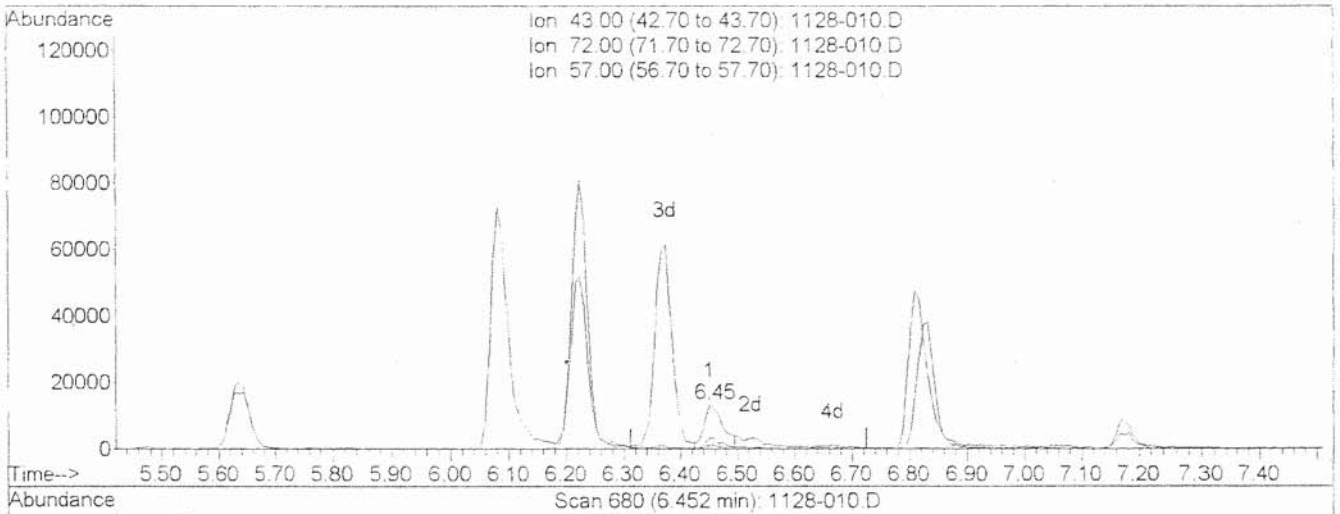
response 29074

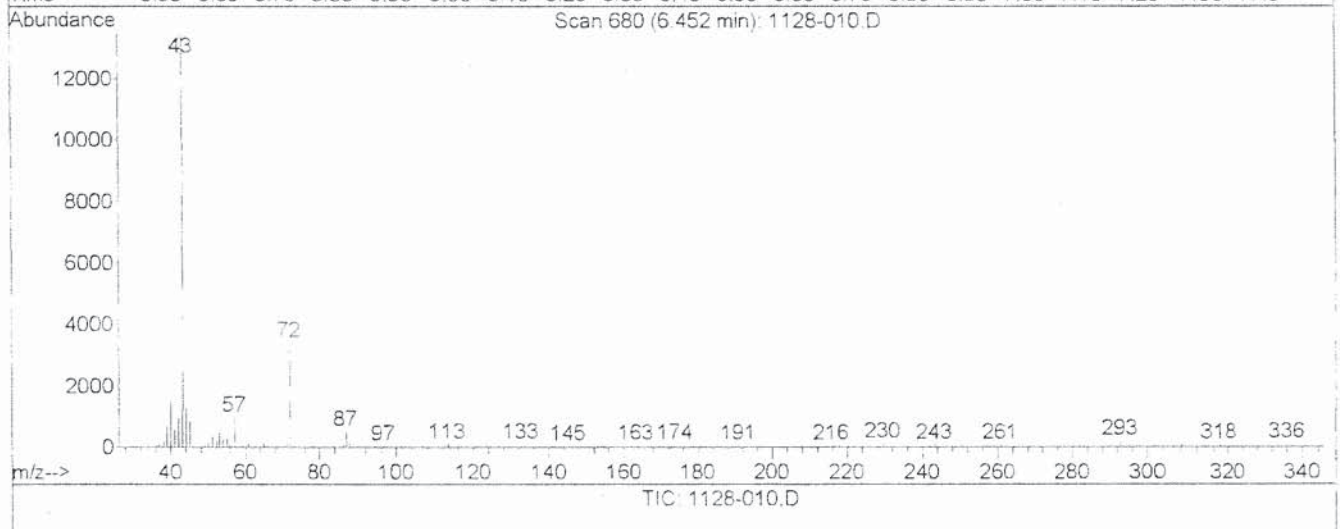
Ion	Exp%	Act%
43.00	100	100
72.00	18.70	24.04#
57.00	7.50	7.85
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:53 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-010.D

(29) 2-Butanone (MEK) (T)

6.45min 8.04ug/L m

response 31827

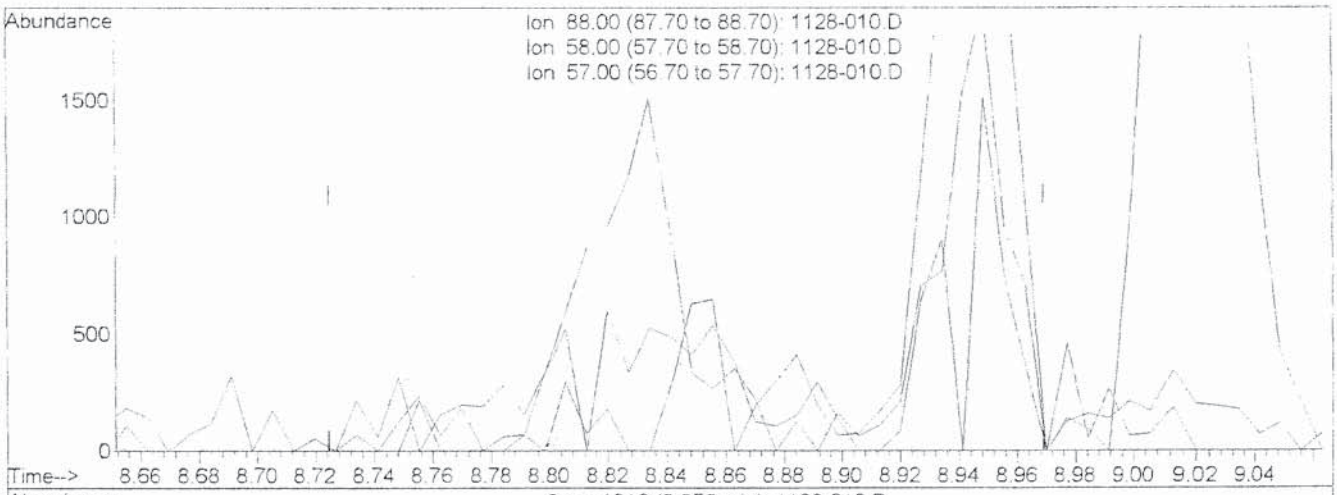
Ion	Exp%	Act%
43.00	100	100
72.00	18.70	21.96
57.00	7.50	7.17
0.00	0.00	0.00

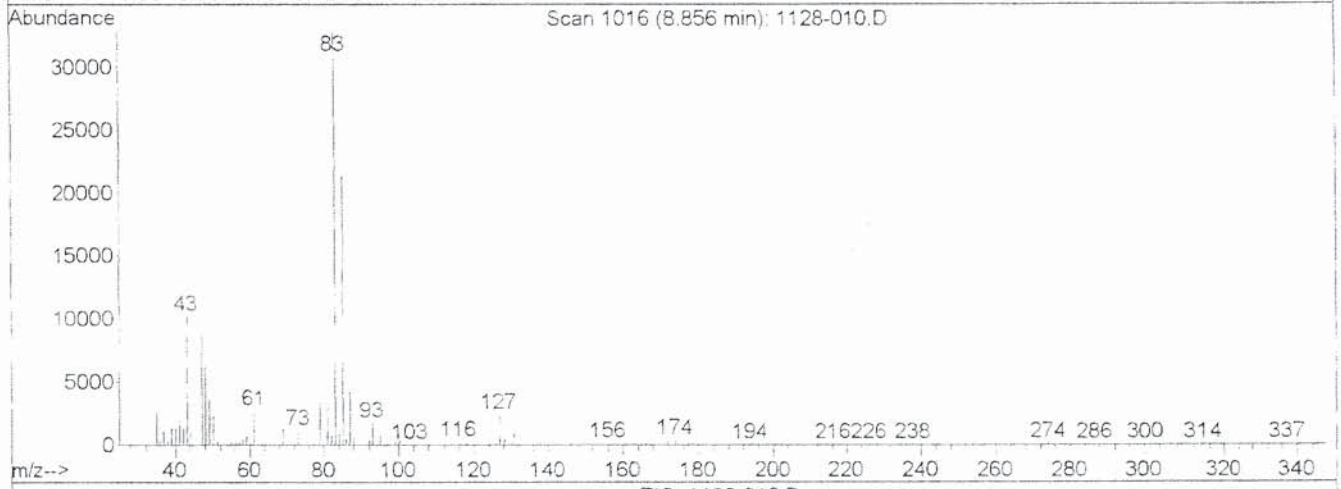
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JDB
DATE 11/6/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:53 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-010.D

(55) 1,4-Dioxane (T)

8.85min 0.00ug/L

response 0

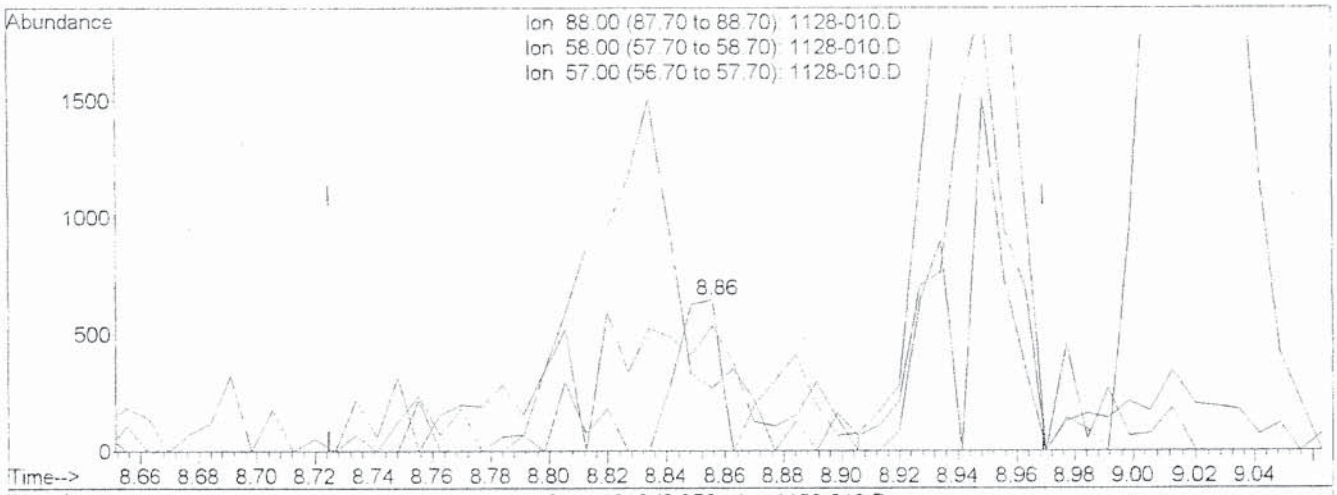
Ion	Exp%	Act%
88.00	100	0.00
58.00	78.40	0.00#
57.00	39.40	0.00#
0.00	0.00	0.00

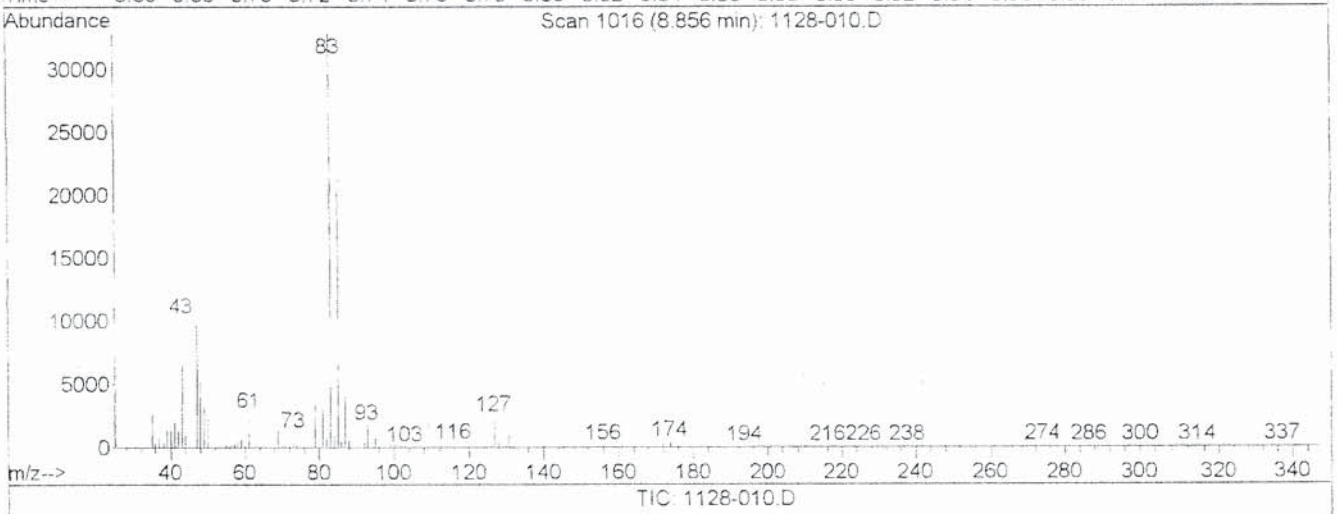
1128-010.D 141118W.M Sun Nov 30 12:54:02 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:54 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-010.D

(55) 1,4-Dioxane (T)

8.86min 13.46ug/L m

response 1201

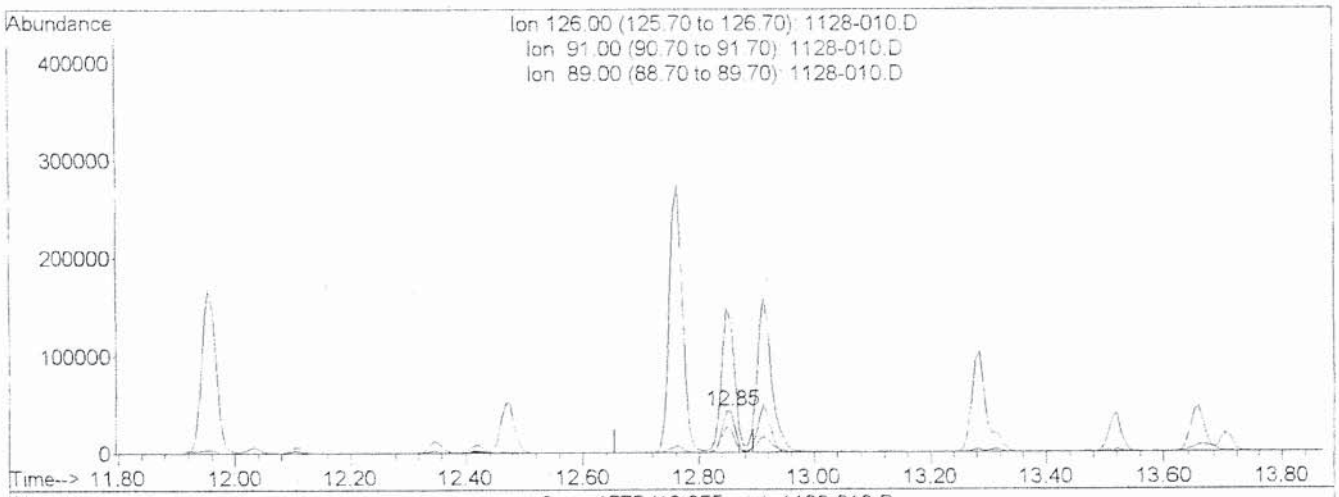
Ion	Exp%	Act%
88.00	100	100
58.00	78.40	0.00#
57.00	39.40	0.00#
0.00	0.00	0.00

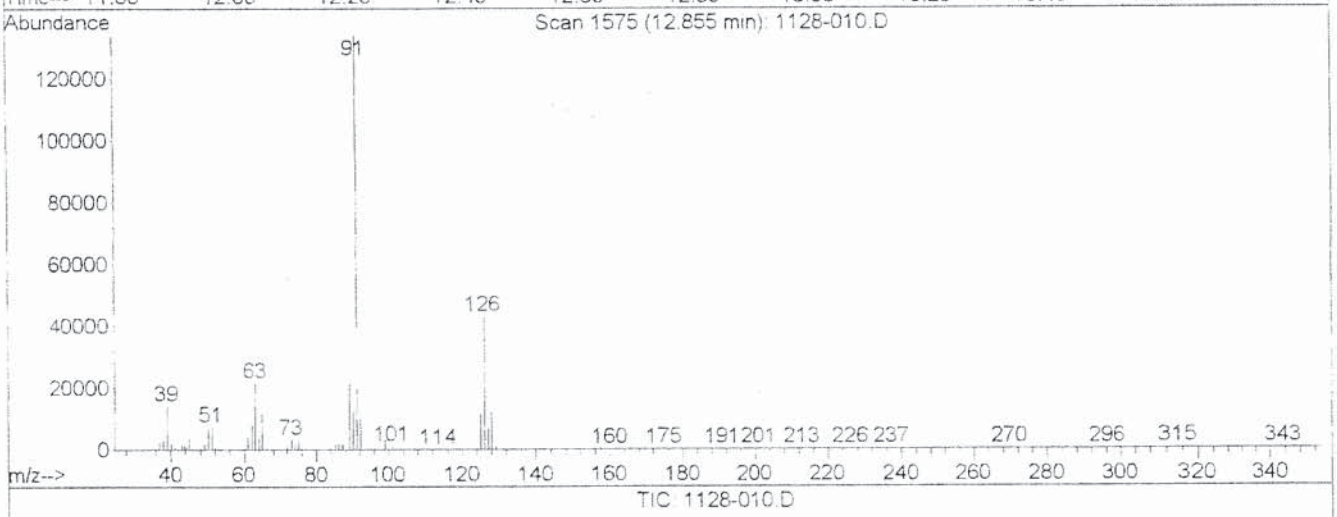
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
(3) PEAK NOT FOUND
4. OTHER
ANALYST ASG
DATE 1/16/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:54 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC 1128-010.D

(91) 2-Chlorotoluene (T)

12.85min 10.42ug/L

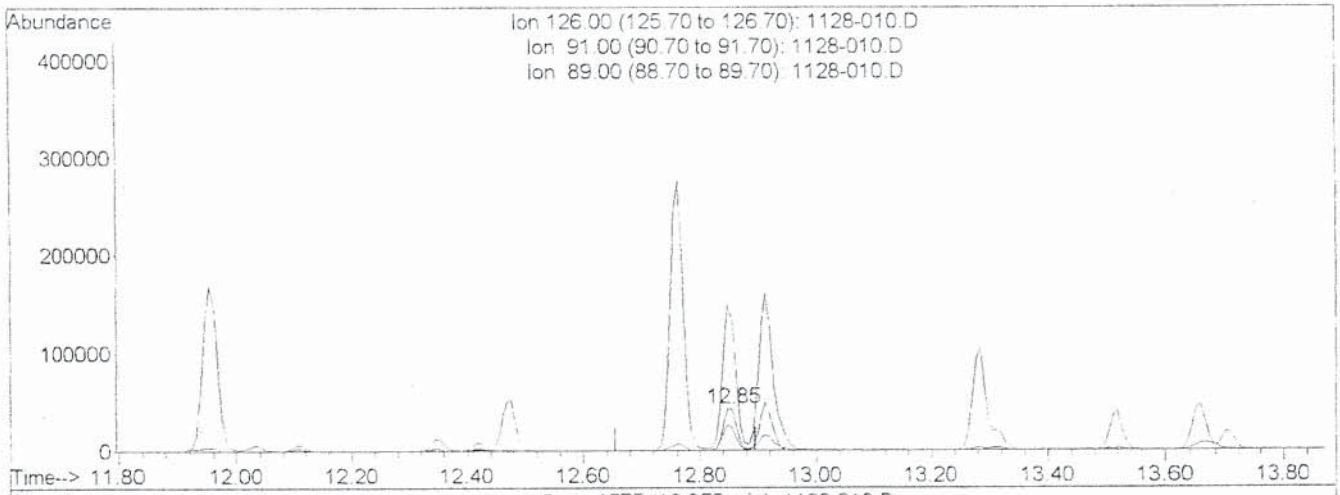
response 68408

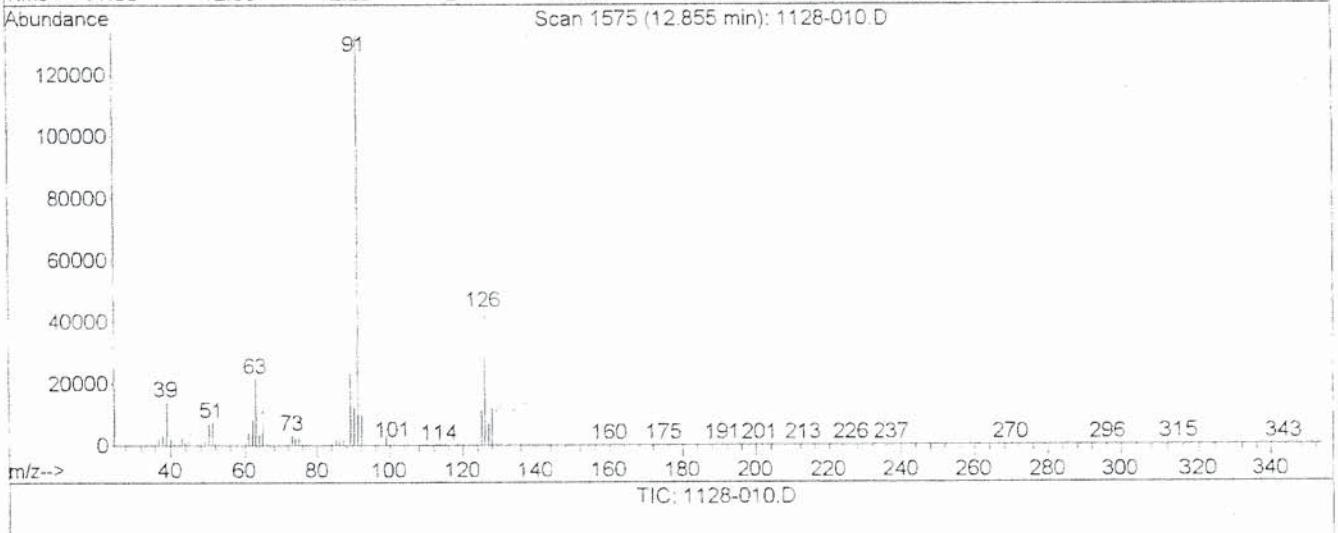
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	333.37
89.00	59.80	60.58
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:54 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-010.D

(91) 2-Chlorotoluene (T)

12.85min 10.71ug/L m

response 70324

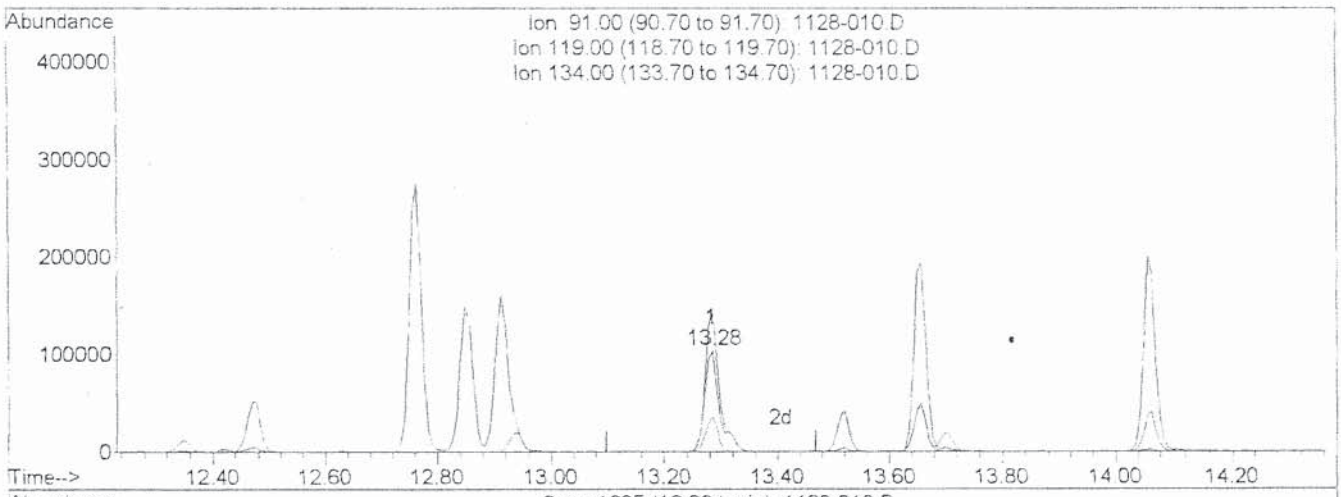
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	324.29
89.00	59.80	58.93
0.00	0.00	0.00

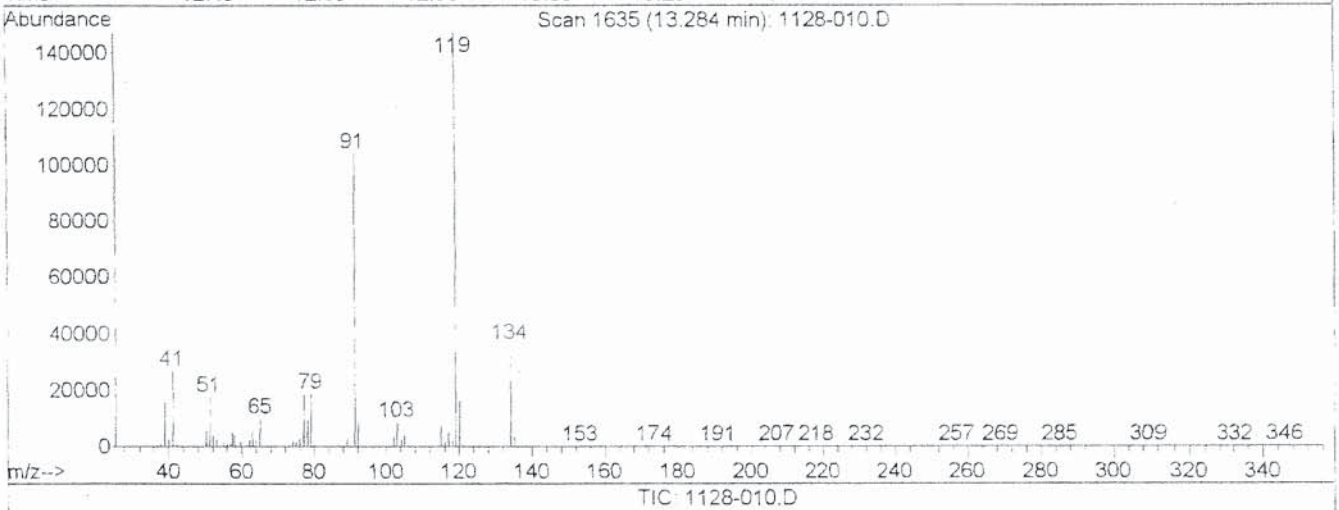
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JDG
DATE 12/2/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:54 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-010.D

(94) tert-Butylbenzene (T)

13.28min 9.25ug/L

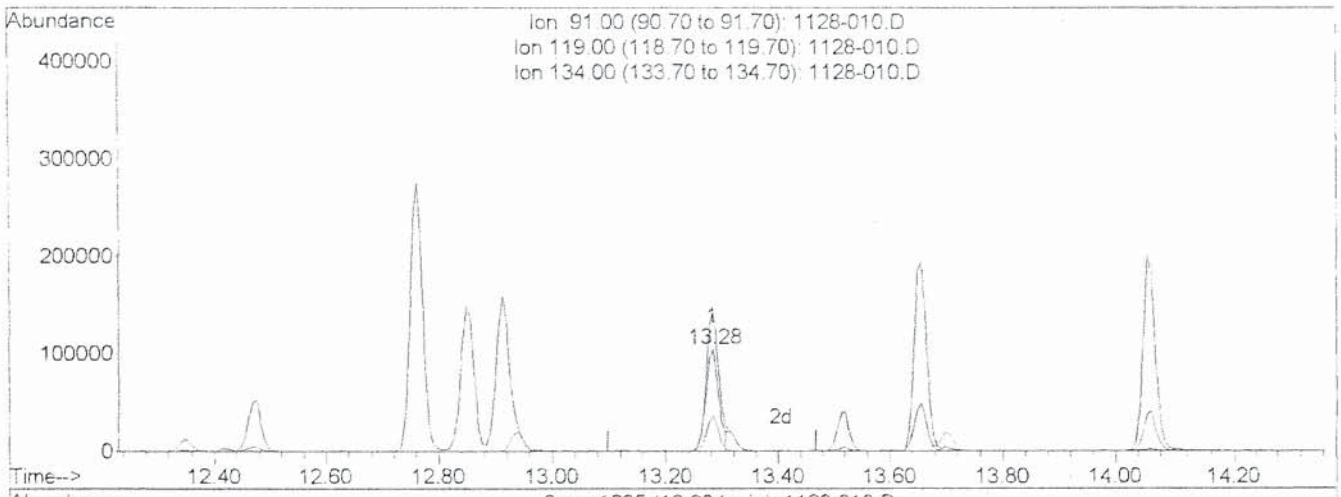
response 187415

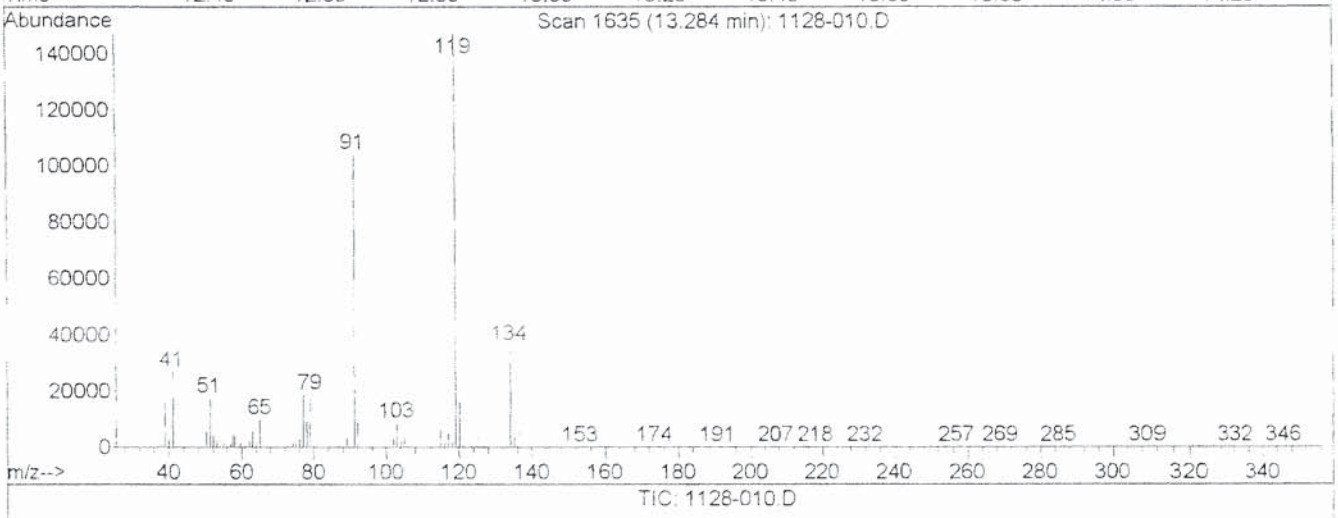
Ion	Exp%	Act%
91.00	100	100
119.00	136.80	135.02
134.00	31.60	29.16
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-010.D Vial: 6
Acq On : 28 Nov 2014 6:25 pm Operator: JDB
Sample : ICAL3 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:54 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-010.D

(94) tert-Butylbenzene (T)

13.28min 8.21ug/L m

response 166287

Ion	Exp%	Act%
91.00	100	100
119.00	136.80	152.18
134.00	31.60	32.86
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JDU
DATE 11/6/15

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:57 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Fluorobenzene	8.15	96	901416	50.00	ug/L	0.00
56) Chlorobenzene-d5	11.27	82	449901	50.00	ug/L	0.00
84) 1,4-Dichlorobenzene-d4	13.67	152	344221	50.00	ug/L	0.00
System Monitoring Compounds						
37) Dibromofluoromethane	7.13	111	198933	50.24	ug/L	0.00
Spiked Amount 50.000	Range 86 - 112		Recovery = 100.48%			
41) 1,2-Dichloroethane-d4	7.63	65	259919	43.62	ug/L	0.00
Spiked Amount 50.000	Range 72 - 121		Recovery = 87.24%			
65) Toluene-d8	9.84	98	953961	52.17	ug/L	0.00
Spiked Amount 50.000	Range 88 - 115		Recovery = 104.34%			
87) 4-Bromofluorobenzene	12.46	95	361564	43.32	ug/L	0.00
Spiked Amount 50.000	Range 86 - 113		Recovery = 86.64%			
Target Compounds						Qvalue
2) Dichlorodifluoromethane	2.14	85	174382	20.71	ug/L	99
3) Chloromethane (P)	2.38	50	162835	15.80	ug/L	96
4) Vinyl Chloride (C)	2.52	62	179809m	21.25	ug/L	
5) Bromomethane	3.01	96	34182	16.55	ug/L	96
6) Chloroethane	3.15	64	163086	28.49	ug/L	95
7) 1,2-Dichlorotrifluoroethan	3.71	67	180751	21.33	ug/L	98
8) Acrolein	3.92	56	16297m	Below Cal		
9) Acetonitrile	4.11	41	17262m	20.52	ug/L	
10) Trichlorofluoromethane	3.70	101	176349	19.70	ug/L	98
11) Acetone	4.03	43	49945	19.58	ug/L	98
12) Diethyl Ether	4.16	59	132247	19.59	ug/L	98
13) 1,1-Dichloroethene (C)	4.52	61	211985	20.44	ug/L	98
14) tert-Butyl Alcohol	4.65	59	52735	77.38	ug/L	91
15) Iodomethane	4.71	142	68937	13.80	ug/L	97
16) Acrylonitrile	4.86	53	61076	21.16	ug/L	97
17) Methylene Chloride	4.99	84	147660	22.16	ug/L	94
18) Methyl Acetate	4.85	43	134821	18.84	ug/L	99
19) Allyl Chloride	4.95	41	260920	20.48	ug/L	96
20) 1,1,2-Trichlorotrifluoroet	4.59	101	114709	23.65	ug/L	97
21) Carbon Disulfide	5.05	76	421508	21.95	ug/L	98
22) trans-1,2-Dichloroethene	5.64	61	210496	20.83	ug/L	98
23) Methyl tert-Butyl Ether	5.64	73	381732	17.98	ug/L	98
24) 1,1-Dichloroethane (P)	6.02	63	280495	21.56	ug/L	99
25) Propionitrile	6.18	54	22404	25.68	ug/L #	72
26) Vinyl Acetate	6.08	43	327690	17.42	ug/L	99
27) Chloroprene	6.27	53	247788	18.39	ug/L	95
28) Hexane	6.22	57	290752	20.47	ug/L	98

(#) = qualifier out of range (m) = manual integration

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:57 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

	Compound	R.T.	QIon	Response	Conc Unit		Qvalue
29)	2-Butanone (MEK)	6.44	43	77111	19.14 ug/L		96
30)	Diisopropyl Ether	6.37	45	560412	19.49 ug/L		98
31)	Methacrylonitrile	6.61	67	70283	21.60 ug/L		87
32)	cis-1,2-Dichloroethene	6.72	61	213063	21.14 ug/L		96
33)	Ethyl Acetate	6.80	70	16456	17.75 ug/L	#	59
34)	Bromochloromethane	6.99	130	74577	21.59 ug/L		98
35)	Chloroform (C)	6.96	83	237048	20.92 ug/L		96
36)	2,2-Dichloropropane	6.82	77	173779	17.73 ug/L	#	88
38)	tert-Butyl Ethyl Ether	6.82	59	485166	18.41 ug/L	#	90
39)	Isobutyl Alcohol	7.05	43	2800	13.68 ug/L	#	92
40)	Tetrahydrofuran	7.17	72	40062	42.69 ug/L		86
42)	1,2-Dichloroethane	7.72	62	189968	19.07 ug/L	#	79
43)	1,1,1-Trichloroethane	7.52	97	179988	22.01 ug/L		99
44)	1,1-Dichloropropene	7.74	75	193820	22.48 ug/L		97
45)	Cyclohexane	7.80	56	318183	20.46 ug/L		98
46)	Isopropyl Acetate	7.80	43	351265	19.10 ug/L		98
47)	Carbon Tetrachloride	7.86	117	145822	22.70 ug/L		100
48)	Benzene	7.89	78	621333	22.19 ug/L		99
49)	tert-Amyl Methyl Ether	8.07	43	153226	17.89 ug/L		97
50)	Dibromomethane	8.81	93	88267	25.40 ug/L		99
51)	1,2-Dichloropropane (C)	8.69	63	177011	21.39 ug/L	#	98
52)	2-Nitropropane	8.95	43	130779	19.04 ug/L	#	94
53)	Trichloroethene	8.65	130	129755	25.51 ug/L		98
54)	Bromodichloromethane	8.86	83	196095	20.96 ug/L		99
55)	1,4-Dioxane	8.84	88	1593m	17.54 ug/L		
57)	Methyl Methacrylate	8.81	69	118805	19.81 ug/L	#	80
58)	n-Propyl Acetate	8.83	43	237747	19.06 ug/L		95
59)	Methyl Cyclohexane	9.02	83	307735	21.47 ug/L		95
60)	2-Chloroethyl Vinyl Ether	9.21	63	109710	20.54 ug/L	#	94
61)	cis-1,3-Dichloropropene	9.44	75	256558	21.65 ug/L		93
62)	4-Methyl-2-pentanone (MIBK	9.35	43	163637	19.95 ug/L		99
63)	trans-1,3-Dichloropropene	9.90	75	228132	19.88 ug/L		96
64)	1,1,2-Trichloroethane	10.06	83	119507	21.47 ug/L		95
66)	Toluene (C)	9.91	92	379551	21.93 ug/L		98
67)	1,3-Dichloropropane	10.27	76	252843	21.91 ug/L		98
68)	Ethyl Methacrylate	10.09	69	216009	20.61 ug/L	#	82
69)	2-Hexanone	10.20	43	104822	18.83 ug/L		97
70)	Dibromochloromethane	10.54	129	130582	21.44 ug/L		97
71)	1,2-Dibromoethane (EDB)	10.75	107	123425	21.88 ug/L		99
72)	Tetrachloroethene	10.64	164	93595	24.39 ug/L		97
73)	1,1,1,2-Tetrachloroethane	11.35	131	120364	21.97 ug/L		99

(#) = qualifier out of range (m) = manual integration
1128-011.D 141118W.M Sun Nov 30 12:57:41 2014 Page 2

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:57 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

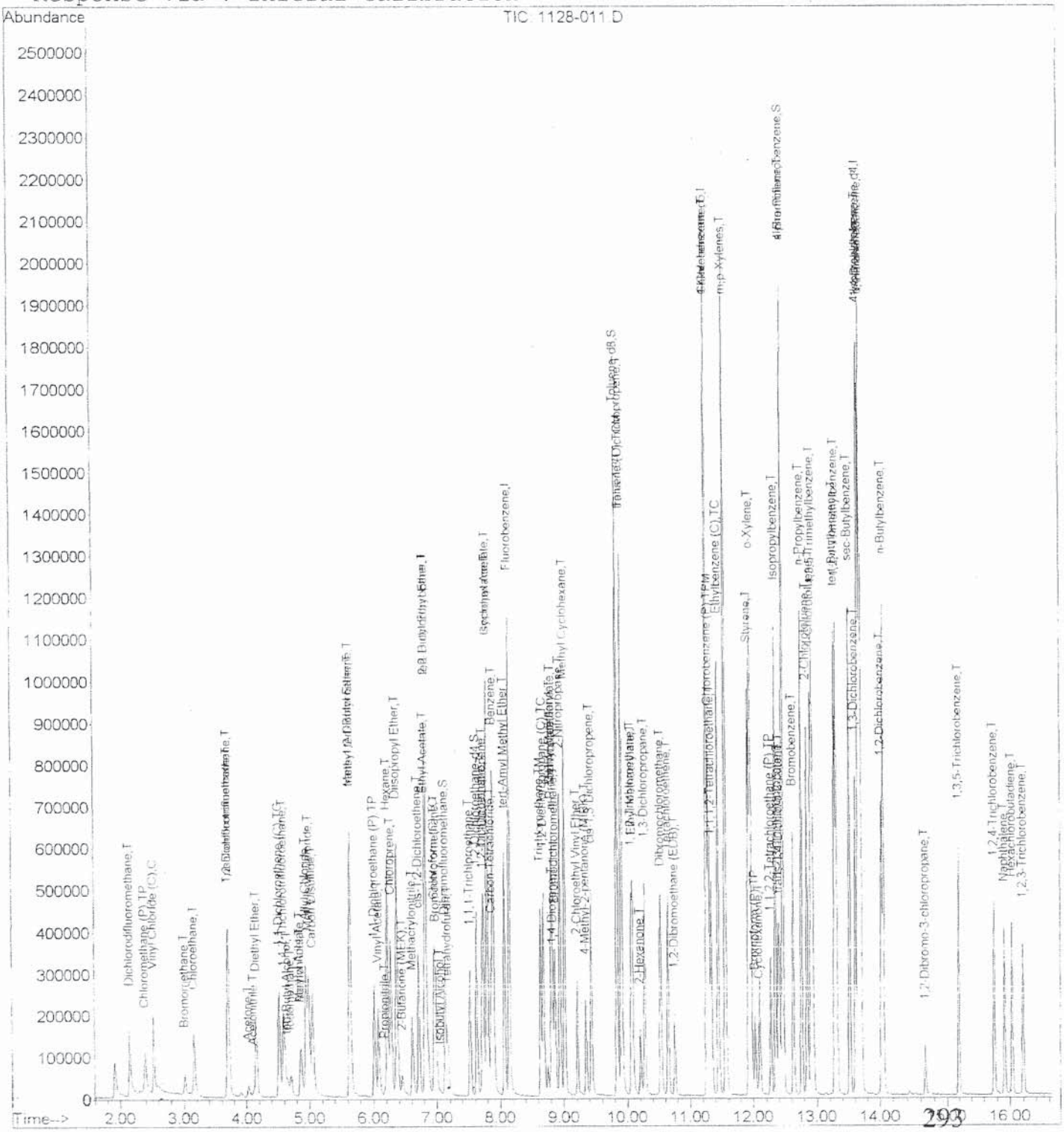
	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
74)	1-Chlorohexane	11.26	91	239682	21.42	ug/L		97
75)	Chlorobenzene (P)	11.30	112	379794	22.27	ug/L		97
76)	Ethylbenzene (C)	11.45	106	218658	21.90	ug/L		99
77)	m,p-Xylenes	11.56	106	560462	42.36	ug/L		96
78)	Bromoform (P)	12.03	173	75893	21.15	ug/L		99
79)	Cyclohexanone	12.09	55	12044	23.35	ug/L	#	42
80)	Styrene	11.92	104	445504	21.82	ug/L	#	87
81)	1,1,2,2-Tetrachloroethane	12.27	83	176724	21.78	ug/L		99
82)	o-Xylene	11.95	106	266728	22.74	ug/L	#	93
83)	1,2,3-Trichloropropane	12.40	110	47733	21.60	ug/L	#	68
85)	trans-1,4-Dichloro-2-buten	12.42	53	56871	18.52	ug/L	#	1
86)	Isopropylbenzene	12.35	120	179318	20.78	ug/L		99
88)	alpha-Pinene	12.47	93	387811	18.82	ug/L		99
89)	Bromobenzene	12.63	77	292450	19.56	ug/L		89
90)	n-Propylbenzene	12.76	120	185546	20.17	ug/L		91
91)	2-Chlorotoluene	12.85	126	149782m	21.89	ug/L		
92)	4-Chlorotoluene	12.91	126	155751	20.25	ug/L	#	90
93)	1,3,5-Trimethylbenzene	12.94	120	277563	20.42	ug/L		98
94)	tert-Butylbenzene	13.28	91	361634m	17.12	ug/L		
95)	1,2,4-Trimethylbenzene	13.31	120	306324	19.98	ug/L	#	74
96)	sec-Butylbenzene	13.52	134	141825	20.06	ug/L		95
97)	1,3-Dichlorobenzene	13.61	146	280862	20.44	ug/L		97
98)	d-Limonene	13.70	68	280910	18.37	ug/L		99
99)	1,4-Dichlorobenzene	13.70	146	302847	20.43	ug/L		100
100)	4-Isopropyltoluene	13.66	134	165736	20.34	ug/L		94
101)	1,2-Dichlorobenzene	14.03	146	263404	20.20	ug/L		99
102)	n-Butylbenzene	14.06	92	355261	20.20	ug/L		96
103)	1,2-Dibromo-3-chloropropan	14.67	157	28484	20.44	ug/L		85
104)	1,3,5-Trichlorobenzene	15.19	180	159693	19.05	ug/L		99
105)	1,2,4-Trichlorobenzene	15.75	180	124640	19.07	ug/L		97
106)	Naphthalene	15.91	128	292141	20.65	ug/L		99
107)	Hexachlorobutadiene	16.03	225	68019	19.91	ug/L	#	93
108)	1,2,3-Trichlorobenzene	16.20	180	99539	19.45	ug/L		98

(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:57 2014 Quant Results File: 141118W.RES

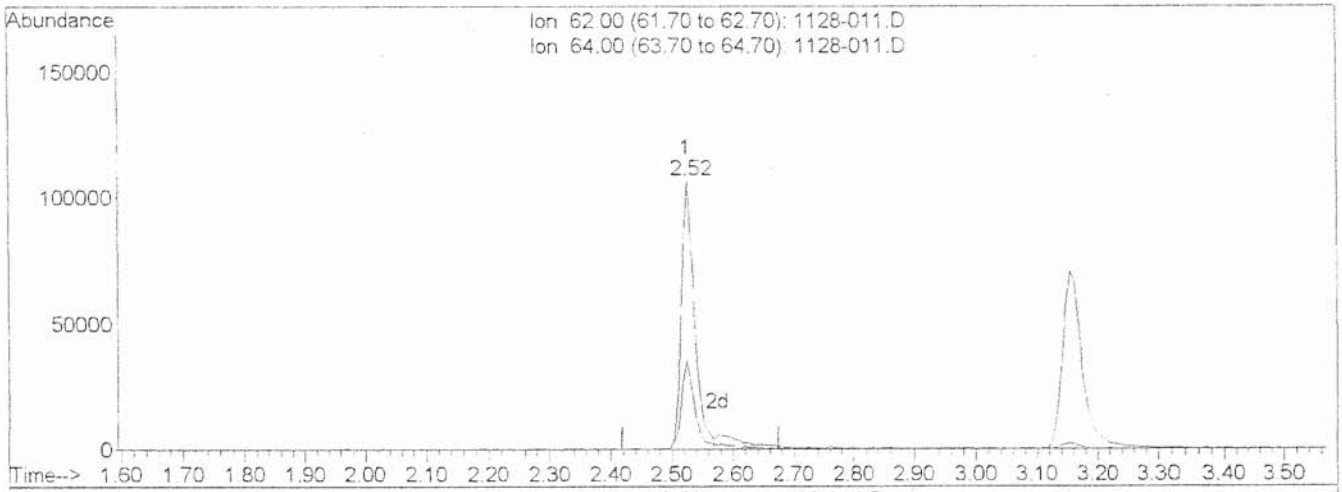
Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration

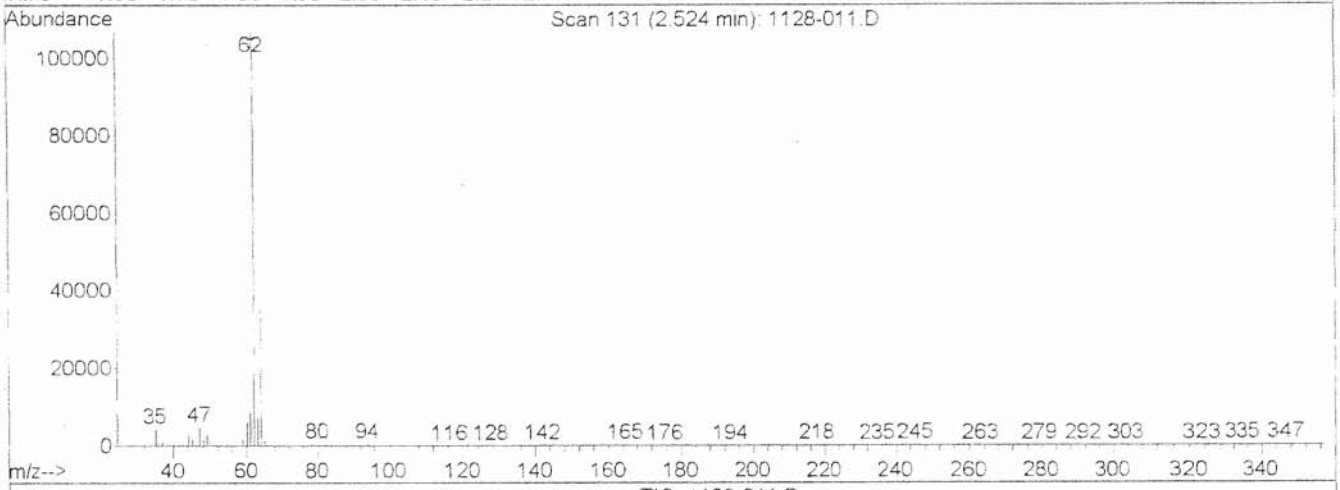


Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 28 19:09 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(4) Vinyl Chloride (C) (C)

2.52min 18.92ug/L

response 160086

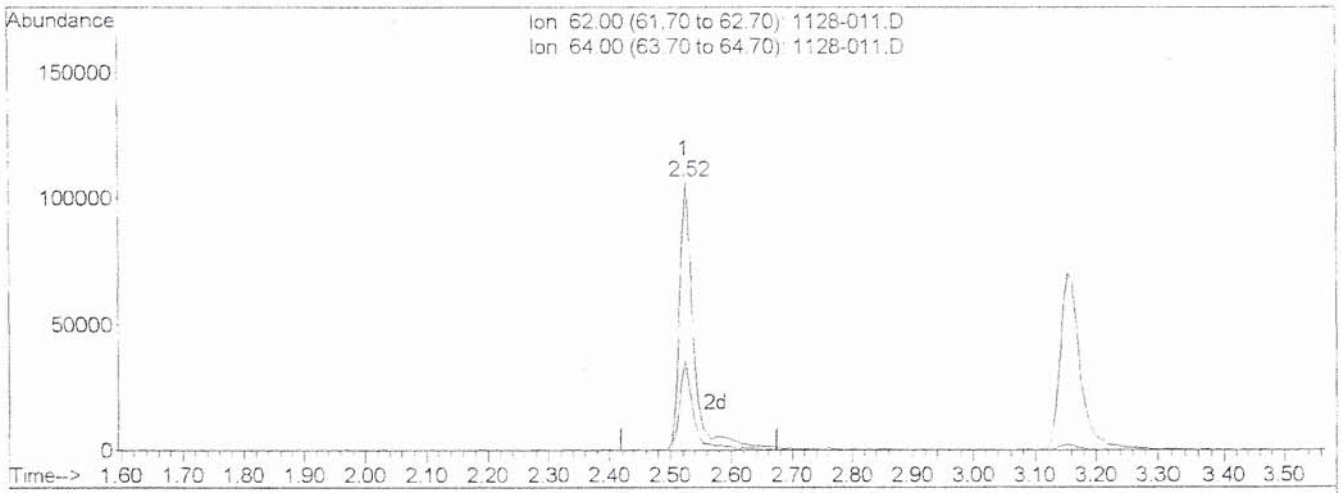
Ion	Exp%	Act%
62.00	100	100
64.00	31.00	35.85
0.00	0.00	0.00
0.00	0.00	0.00

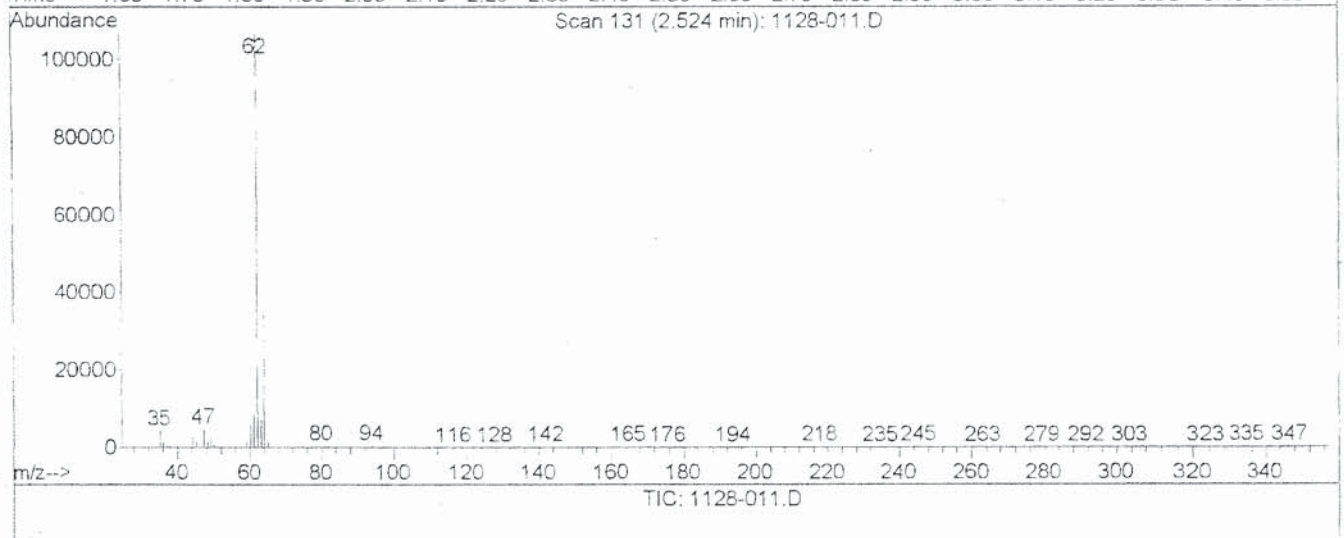
AJG

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:55 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(4) Vinyl Chloride (C) (C)

2.52min 21.25ug/L m

response 179809

Ion	Exp%	Act%
62.00	100	100
64.00	31.00	31.92
0.00	0.00	0.00
0.00	0.00	0.00

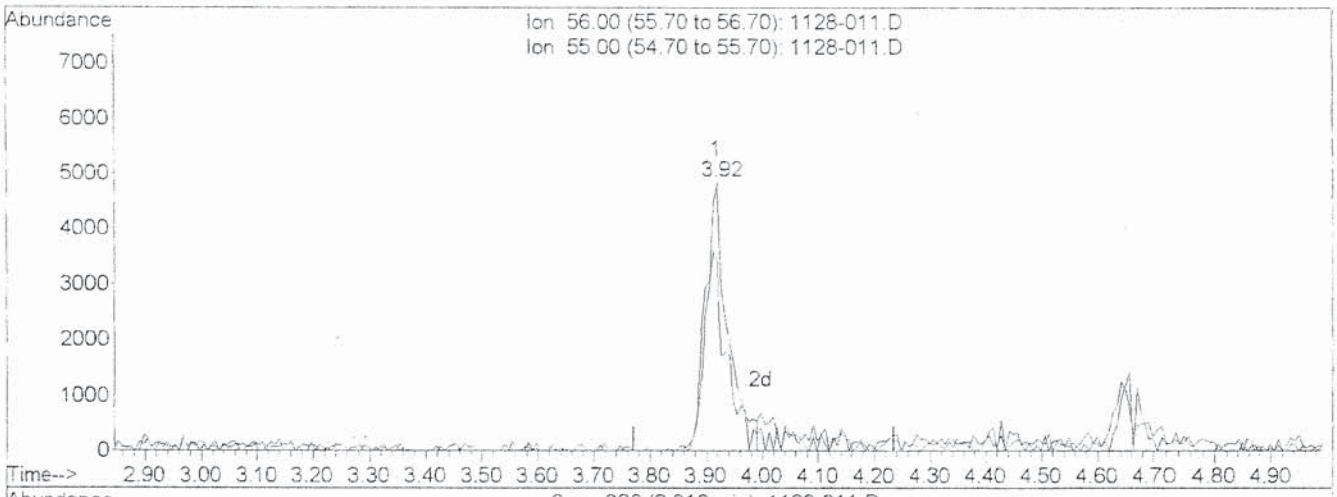
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 1/10/15

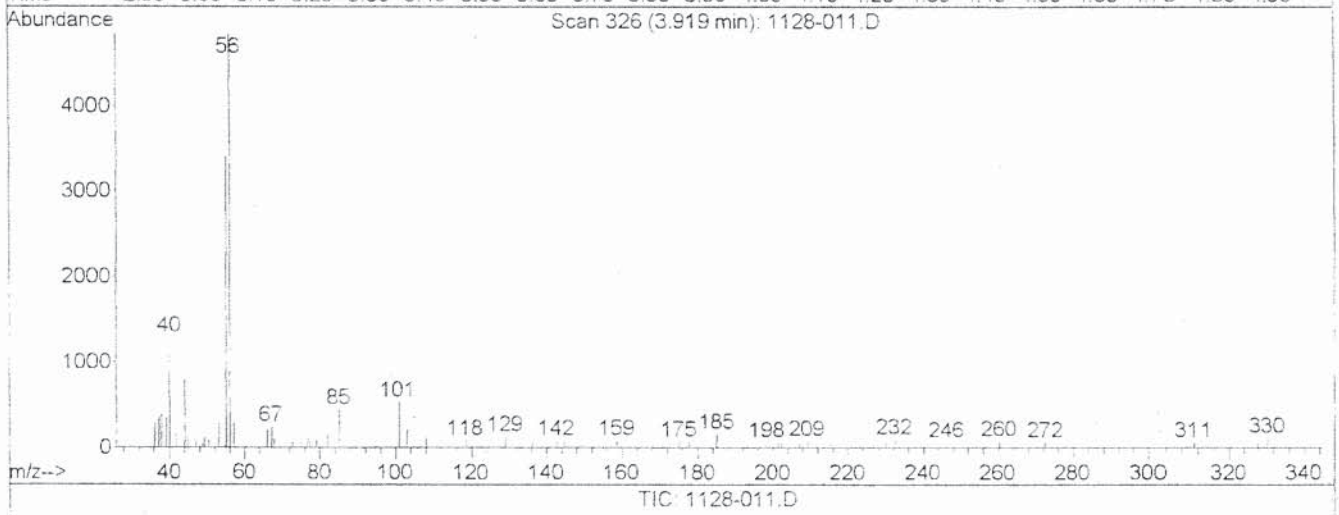
1128-011.D 141118W.M Sun Nov 30 12:55:18 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:55 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(8) Acrolein (T)

3.92min -1.00ug/L

response 13728

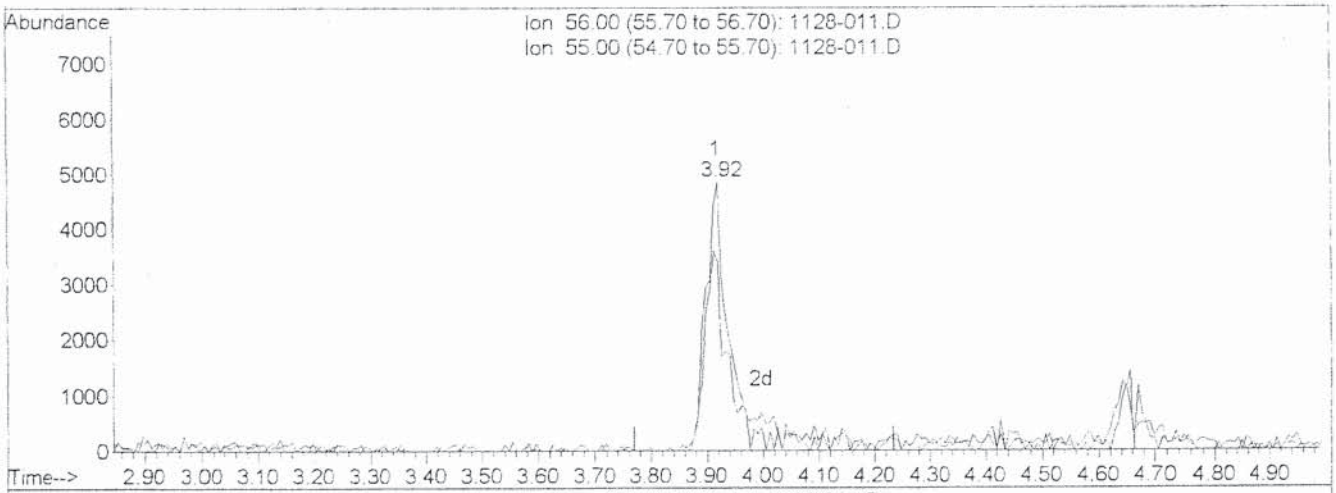
Ion	Exp%	Act%
56.00	100	100
55.00	72.90	71.58
0.00	0.00	0.00
0.00	0.00	0.00

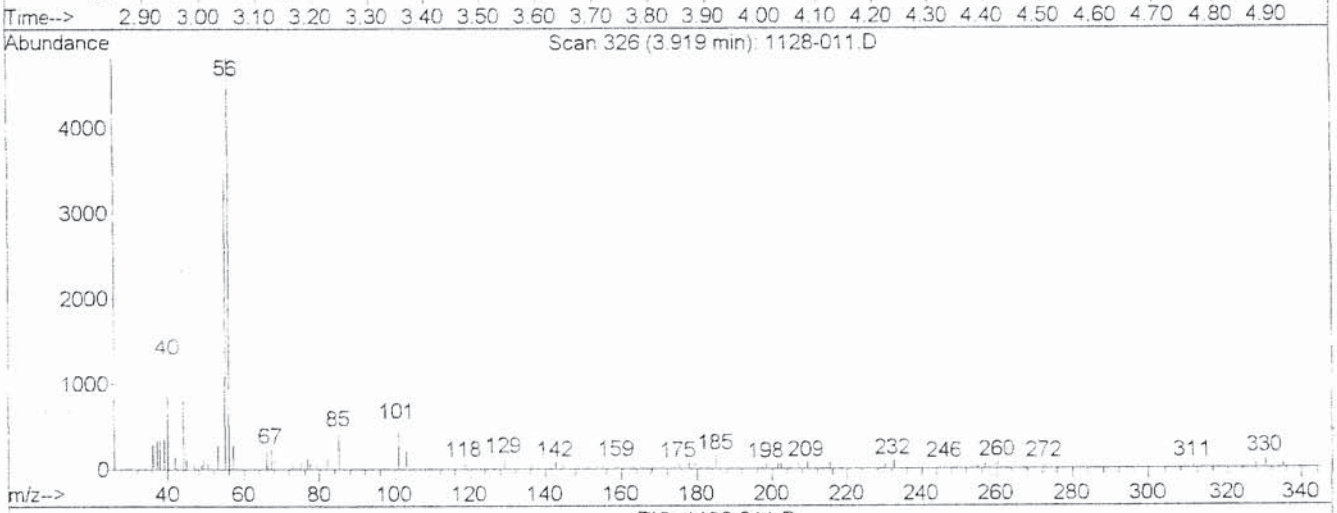
1 Mg

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:55 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(8) Acrolein (T)

3.92min -1.00ug/L m

response 16297

Ion	Exp%	Act%
56.00	100	100
55.00	72.90	60.30
0.00	0.00	0.00
0.00	0.00	0.00

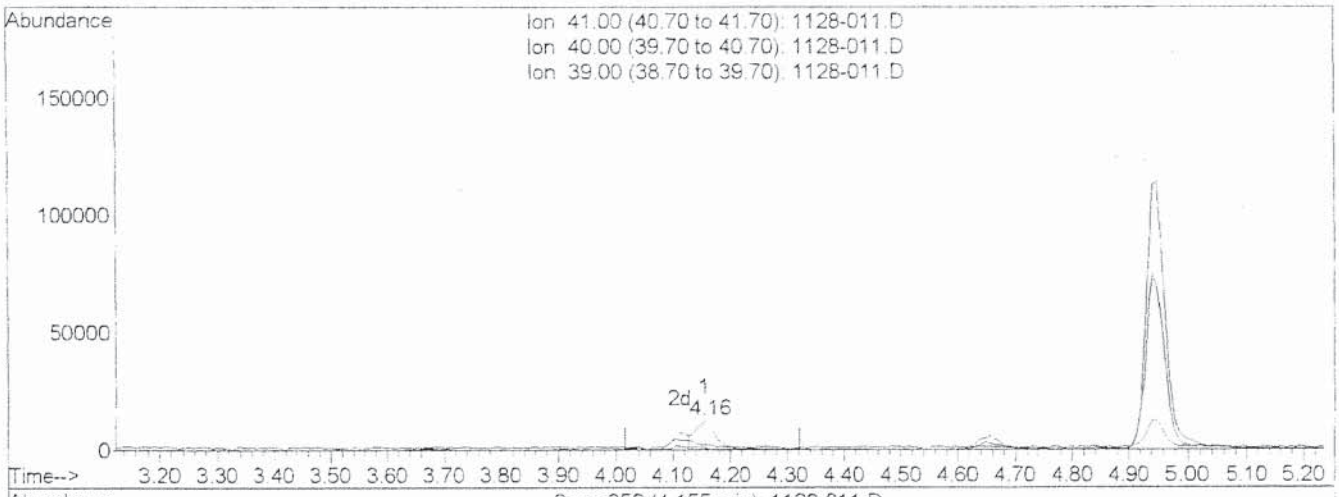
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 11/e/15

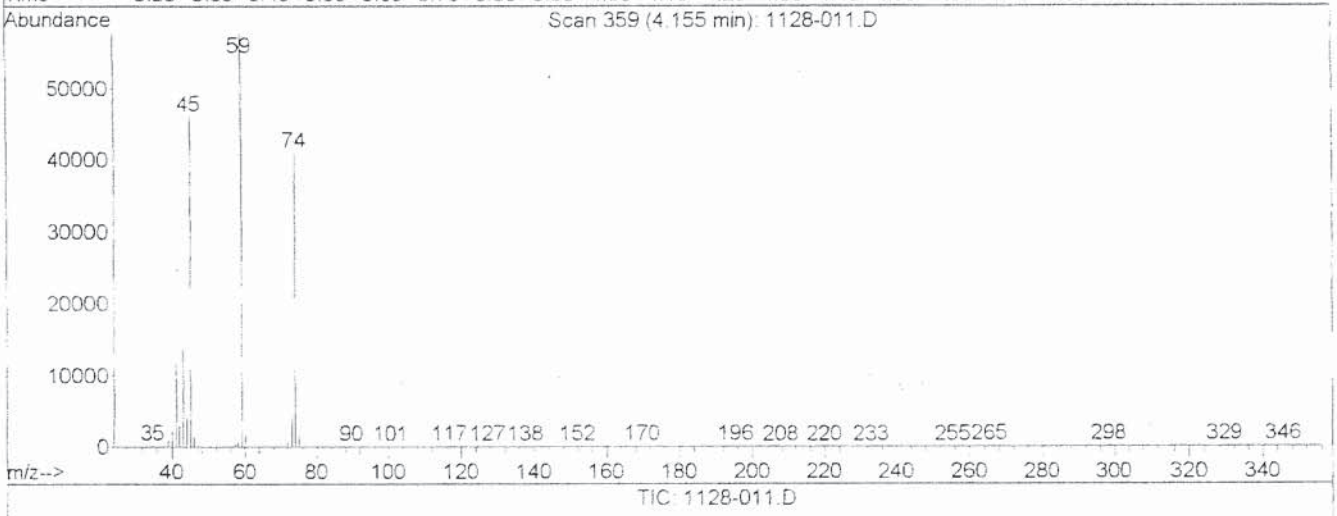
1128-011.D 141118W.M Sun Nov 30 12:55:28 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:55 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(9) Acetonitrile (T)

4.16min 35.52ug/L

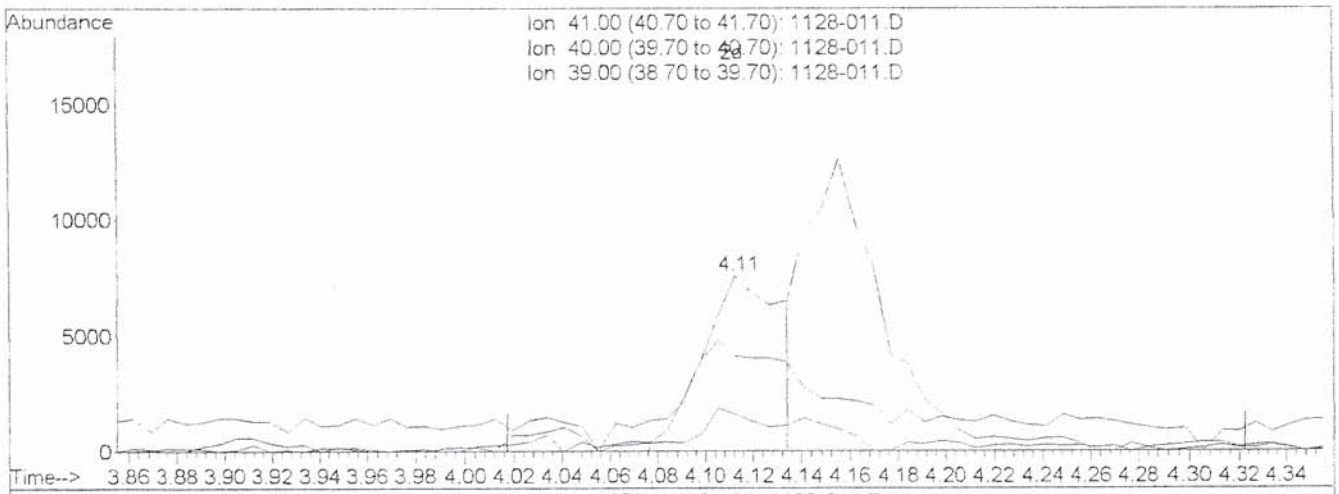
response 28489

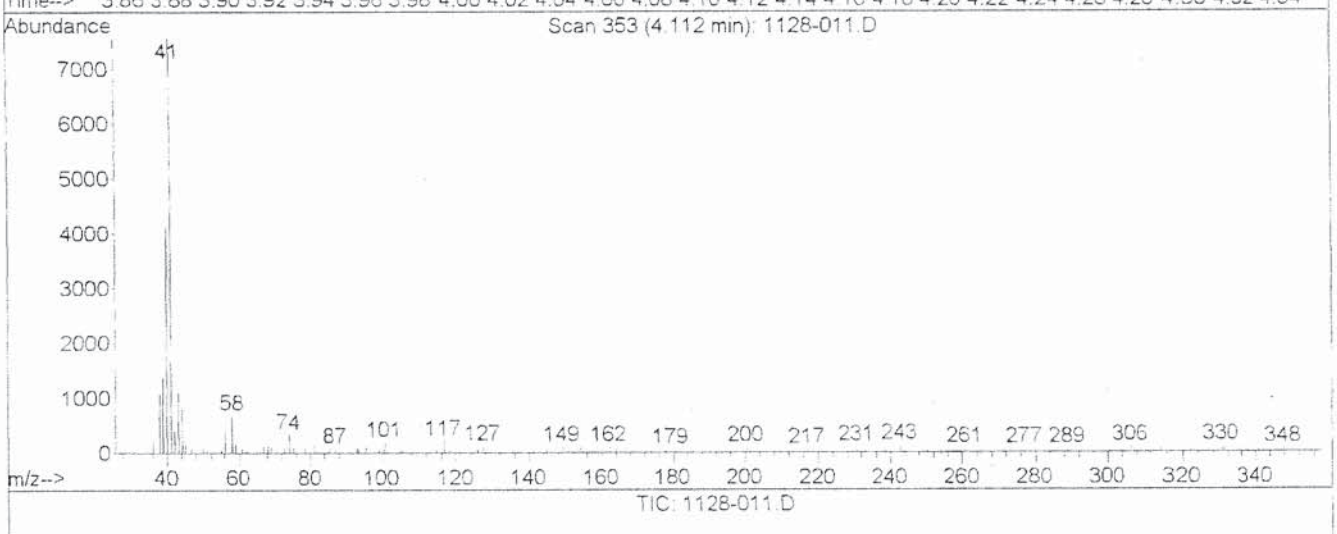
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	0.00#
39.00	15.40	8.01#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:55 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(9) Acetonitrile (T)

4.11min 20.52ug/L m

response 17262

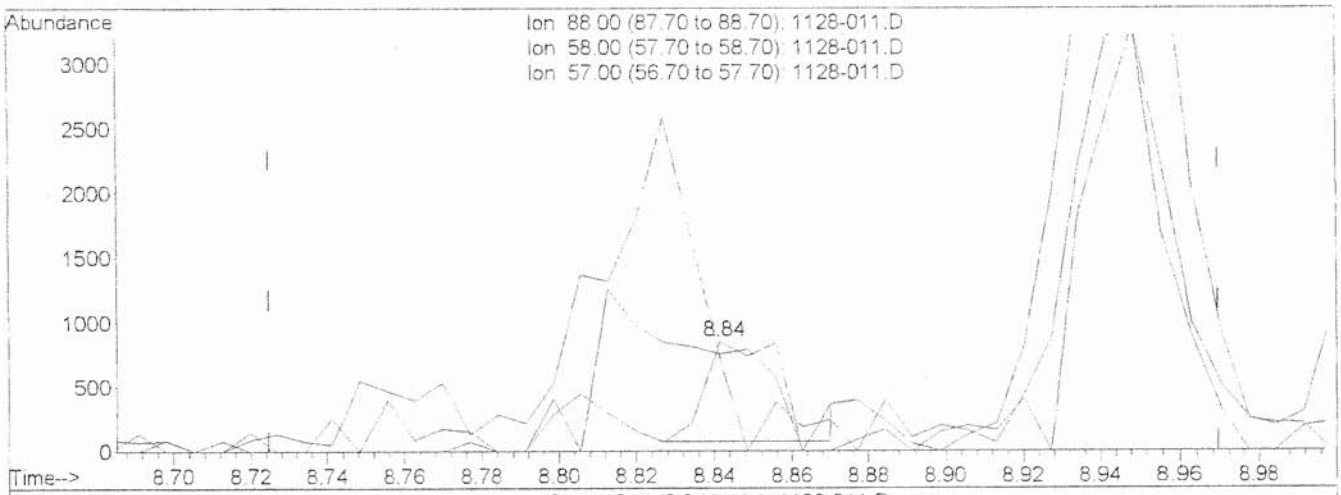
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	0.00#
39.00	15.40	13.22
0.00	0.00	0.00

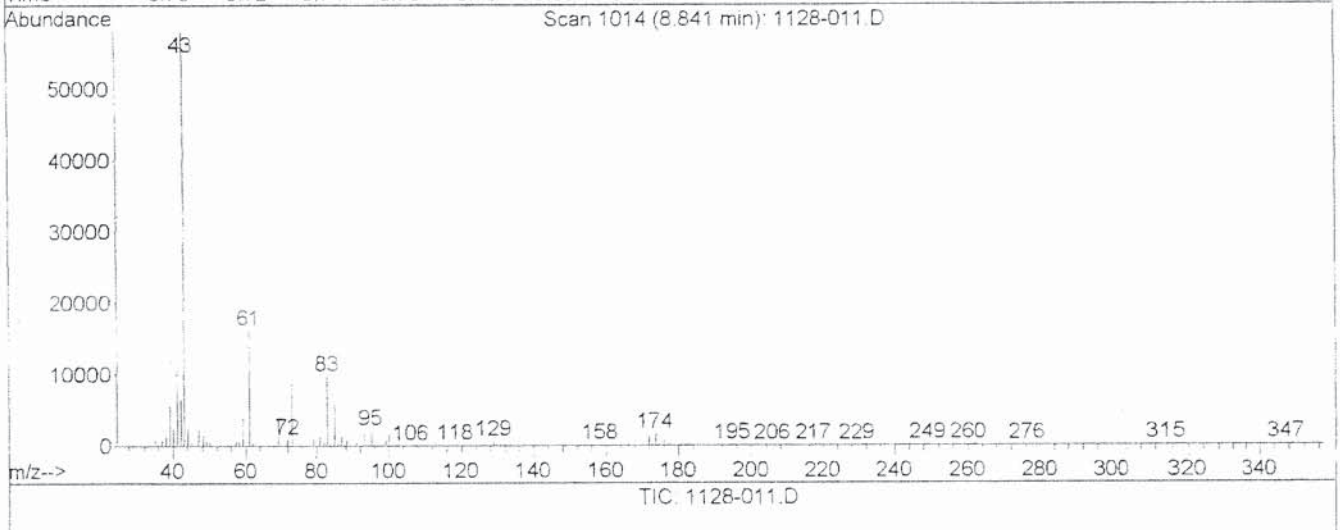
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JJC
DATE 11/6/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:55 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(55) 1,4-Dioxane (T)

8.84min 12.21ug/L

response 1109

Ion	Exp%	Act%
88.00	100	100
58.00	78.40	249.05#
57.00	39.40	437.24#
0.00	0.00	0.00

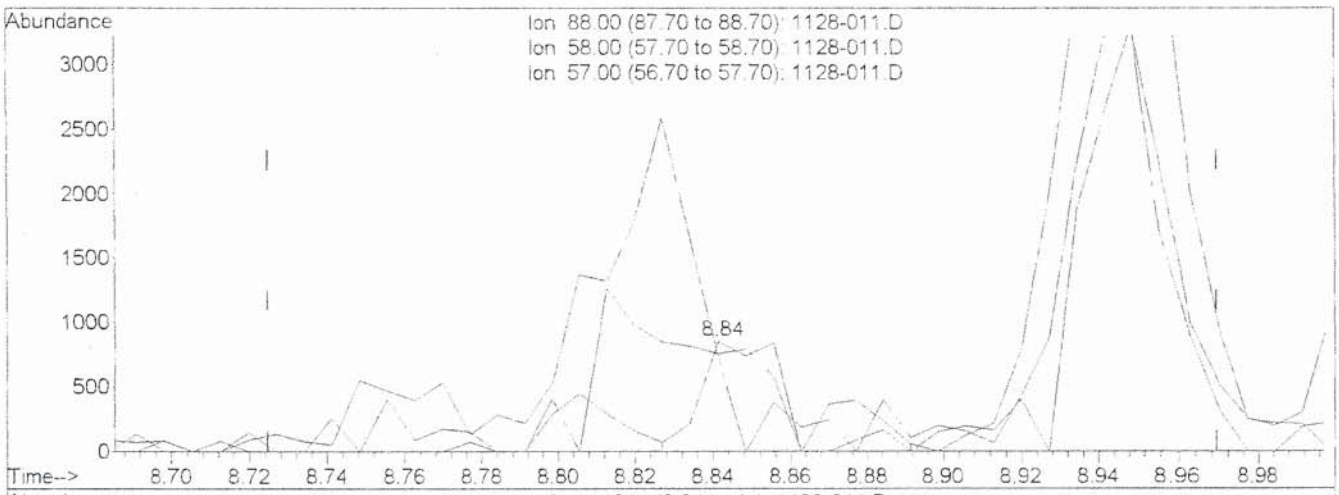
JJG

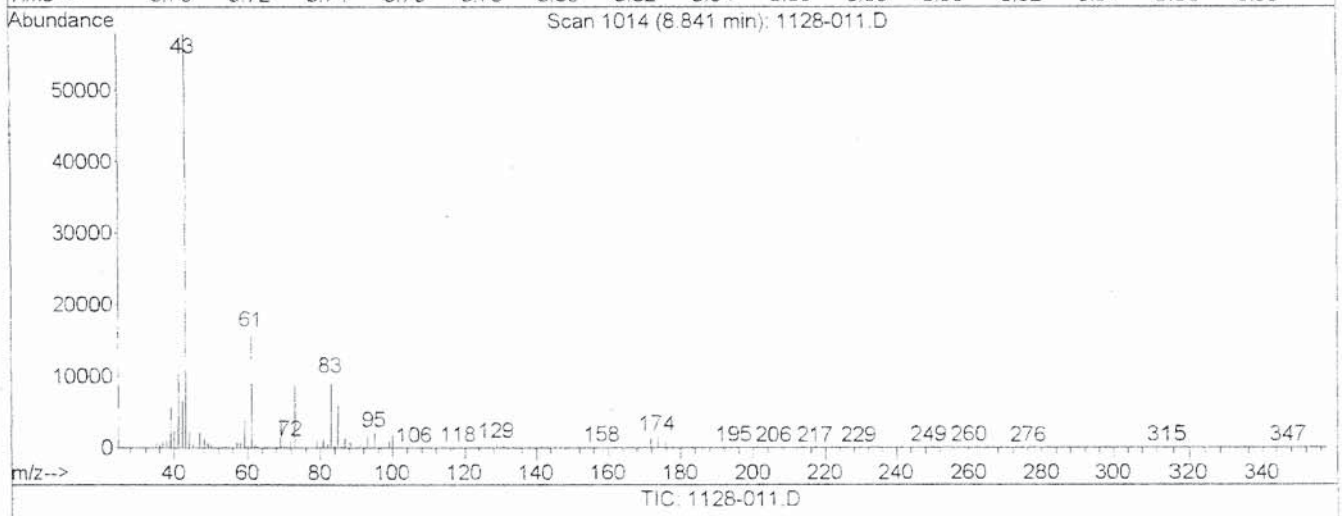
1128-011.D 141118W.M Sun Nov 30 12:56:16 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:56 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(55) 1,4-Dioxane (T)

8.84min 17.54ug/L m

response 1593

Ion	Exp%	Act%
88.00	100	100
58.00	78.40	173.38#
57.00	39.40	304.39#
0.00	0.00	0.00

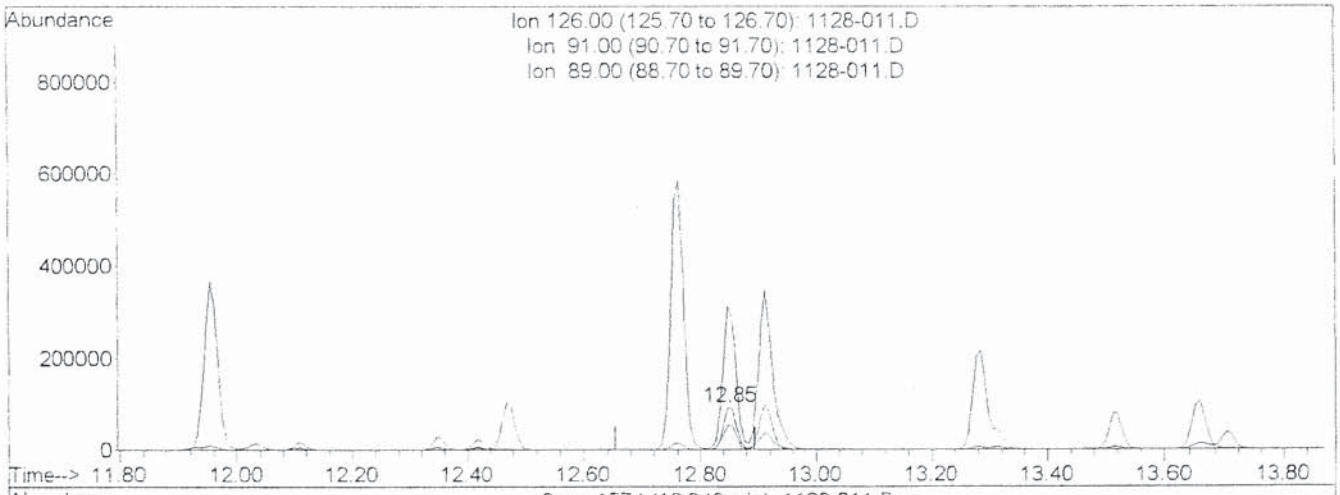
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DJG
DATE 1/6/15

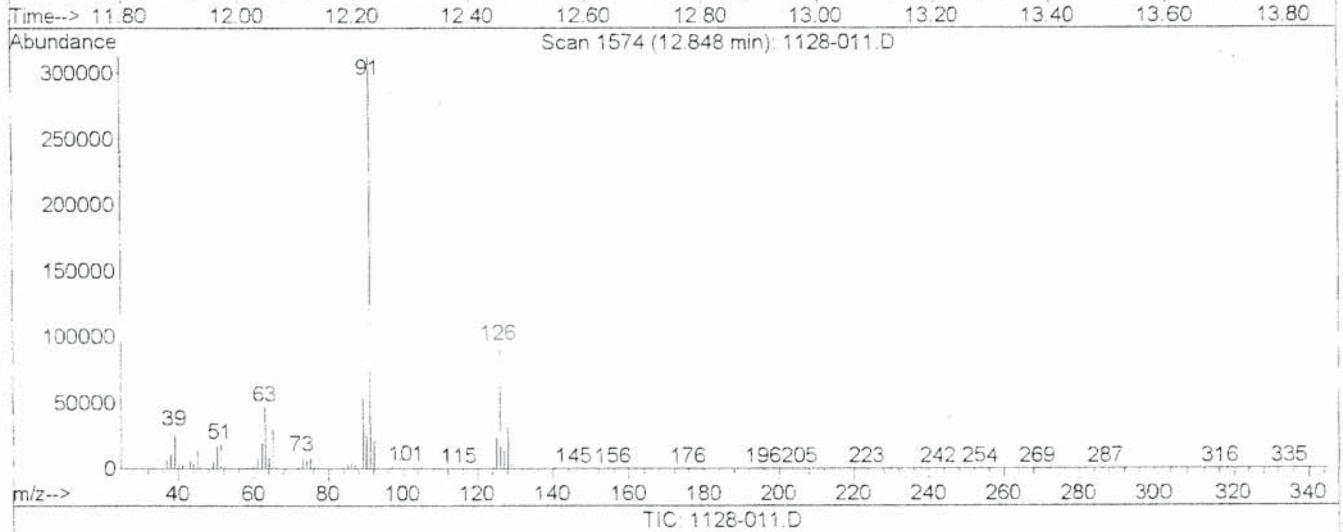
1128-011.D 141118W.M Sun Nov 30 12:56:23 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:56 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(91) 2-Chlorotoluene (T)

12.85min 21.31ug/L

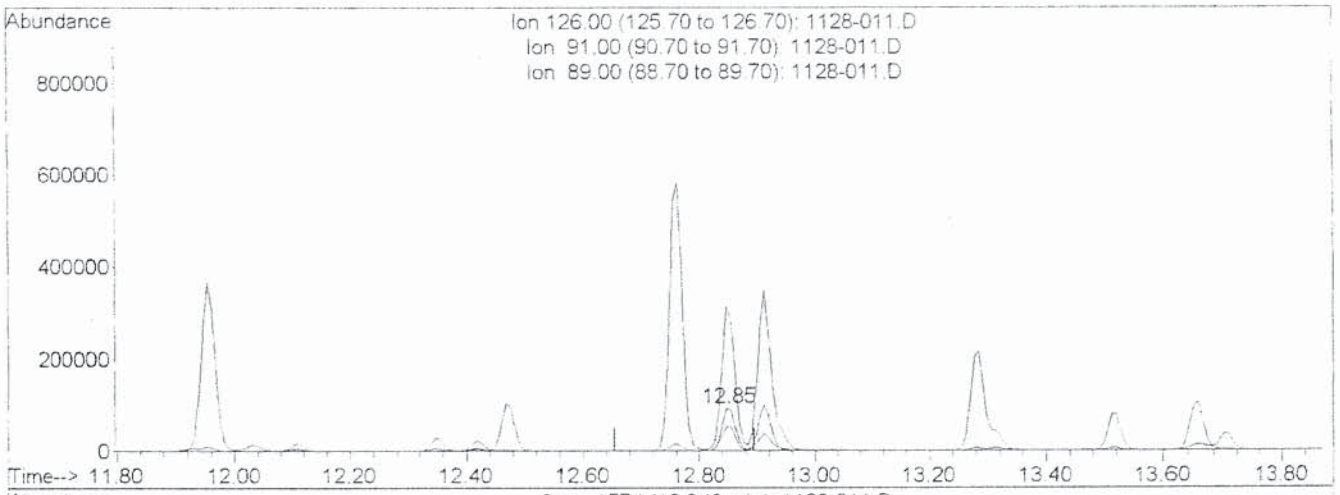
response 145804

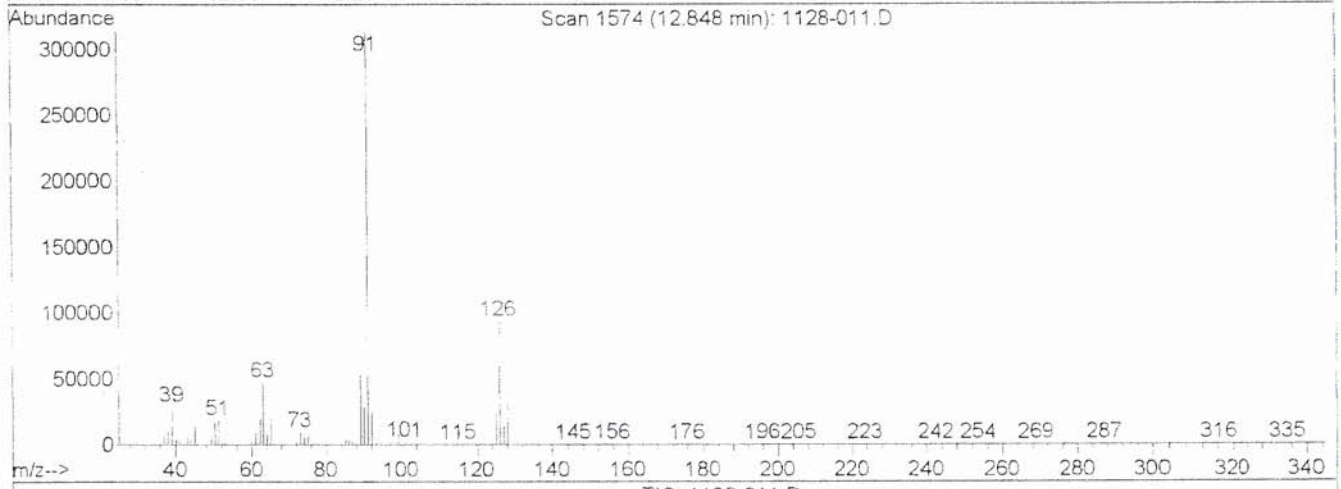
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	328.37
89.00	59.80	58.70
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:57 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(91) 2-Chlorotoluene (T)

12.85min 21.89ug/L m

response 149782

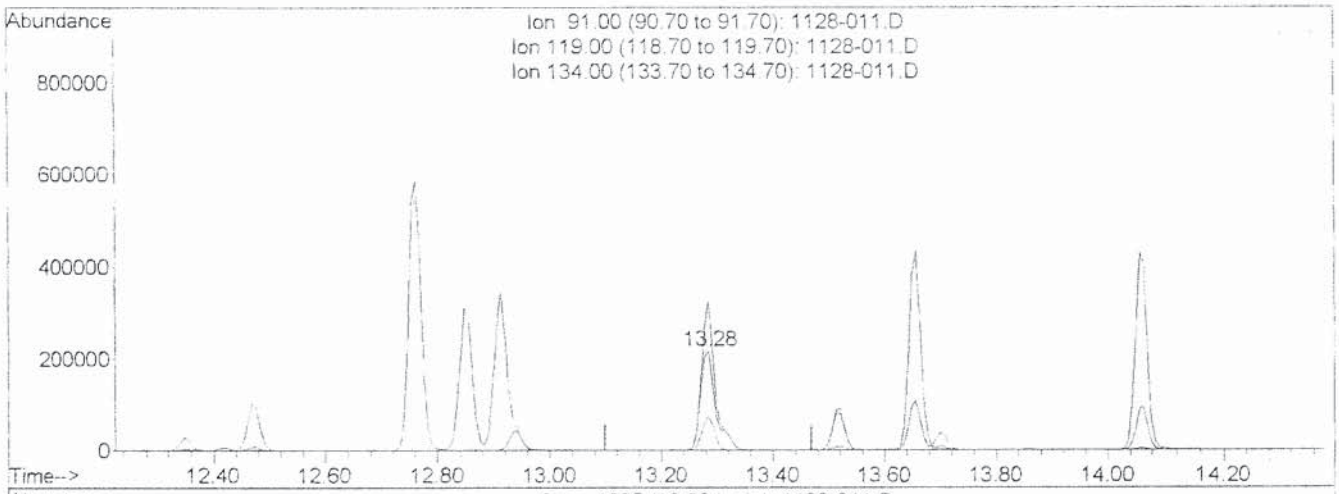
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	319.65
89.00	59.80	57.14
0.00	0.00	0.00

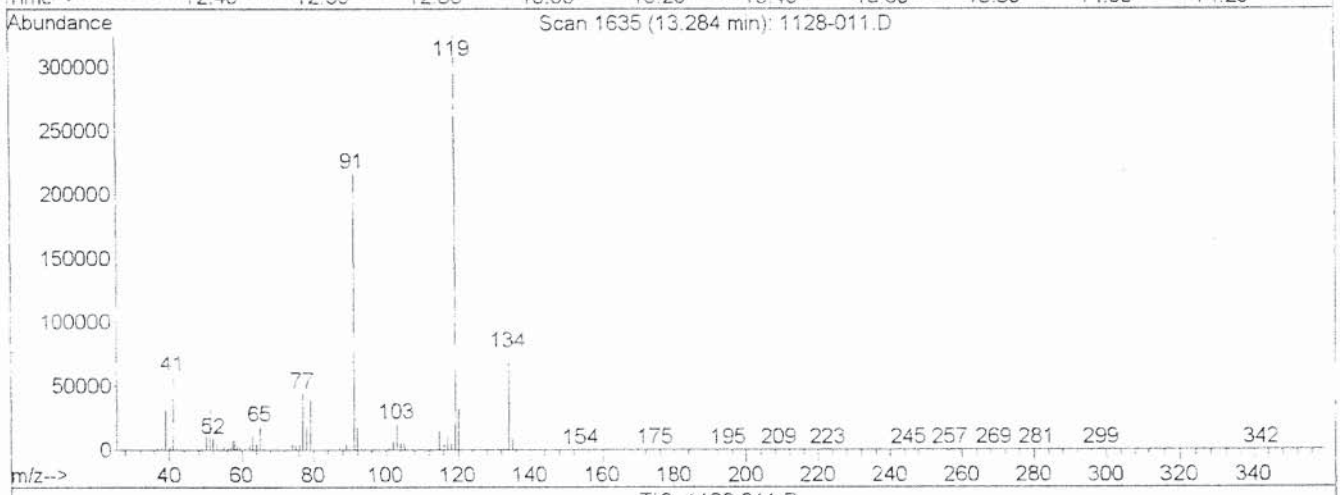
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DJC
DATE 1/6/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:57 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(94) tert-Butylbenzene (T)

13.28min 19.18ug/L

response 405083

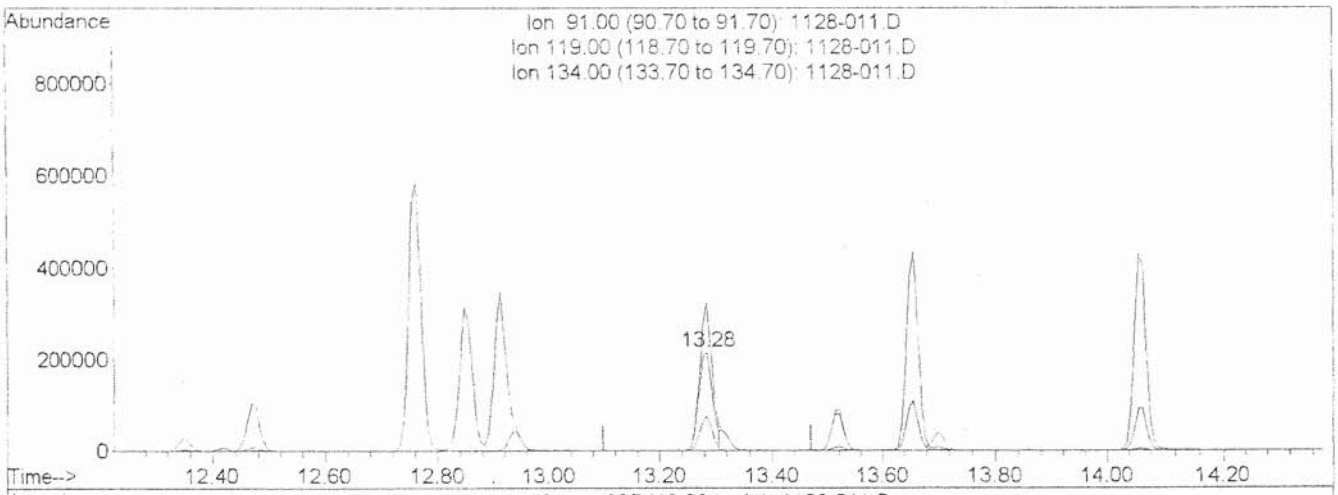
Ion	Exp%	Act%
91.00	100	100
119.00	136.80	133.79
134.00	31.60	28.49
0.00	0.00	0.00

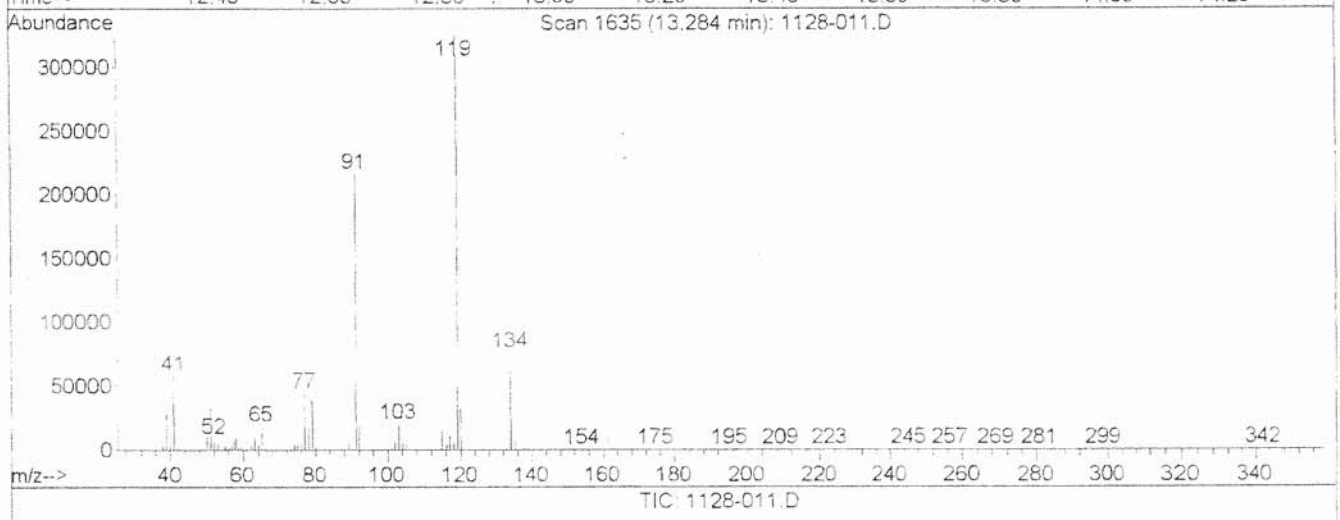
1128-011.D 141118W.M Sun Nov 30 12:57:23 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-011.D Vial: 7
Acq On : 28 Nov 2014 6:52 pm Operator: JDB
Sample : ICAL4 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:57 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-011.D

(94) tert-Butylbenzene (T)

13.28min 17.12ug/L m

response 361634

Ion	Exp%	Act%
91.00	100	100
119.00	136.80	149.87
134.00	31.60	31.91
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DLC
DATE 1/6/15

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:59 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Fluorobenzene	8.15	96	968421	50.00	ug/L	0.00
56) Chlorobenzene-d5	11.27	82	493745	50.00	ug/L	0.00
84) 1,4-Dichlorobenzene-d4	13.67	152	394353	50.00	ug/L	0.00
System Monitoring Compounds						
37) Dibromofluoromethane	7.13	111	216819	50.97	ug/L	0.00
Spiked Amount 50.000	Range 86 - 112		Recovery = 101.94%			
41) 1,2-Dichloroethane-d4	7.63	65	280271	43.78	ug/L	0.00
Spiked Amount 50.000	Range 72 - 121		Recovery = 87.56%			
65) Toluene-d8	9.84	98	1051333	52.39	ug/L	0.00
Spiked Amount 50.000	Range 88 - 115		Recovery = 104.78%			
87) 4-Bromofluorobenzene	12.46	95	413291	43.22	ug/L	0.00
Spiked Amount 50.000	Range 86 - 113		Recovery = 86.44%			
Target Compounds						Qvalue
2) Dichlorodifluoromethane	2.14	85	466730	51.59	ug/L	98
3) Chloromethane (P)	2.38	50	281126	25.39	ug/L	97
4) Vinyl Chloride (C)	2.52	62	446310	49.10	ug/L	97
5) Bromomethane	3.01	96	105850	32.28	ug/L	94
6) Chloroethane	3.15	64	385518	62.69	ug/L	95
7) 1,2-Dichlorotrifluoroethan	3.71	67	489116	53.73	ug/L	98
8) Acrolein	3.91	56	48681m	253.38	ug/L	
9) Acetonitrile	4.14	41	47709m	56.80	ug/L	
10) Trichlorofluoromethane	3.70	101	486689	50.61	ug/L	98
11) Acetone	4.04	43	122246	44.68	ug/L	94
12) Diethyl Ether	4.16	59	347187	47.88	ug/L	98
13) 1,1-Dichloroethene (C)	4.52	61	579157	49.34	ug/L	98
14) tert-Butyl Alcohol	4.66	59	137070	187.22	ug/L #	85
15) Iodomethane	4.71	142	229691	42.14	ug/L	99
16) Acrylonitrile	4.87	53	159084	45.40	ug/L	95
17) Methylene Chloride	4.99	84	388870	54.32	ug/L	93
18) Methyl Acetate	4.86	43	353626	46.00	ug/L	98
19) Allyl Chloride	4.95	41	682907	49.89	ug/L #	96
20) 1,1,2-Trichlorotrifluoroet	4.60	101	308820	51.55	ug/L	96
21) Carbon Disulfide	5.05	76	1112490	53.92	ug/L	99
22) trans-1,2-Dichloroethene	5.65	61	579425	53.38	ug/L	99
23) Methyl tert-Butyl Ether	5.64	73	1070455	46.94	ug/L	100
24) 1,1-Dichloroethane (P)	6.02	63	732470	52.39	ug/L	99
25) Propionitrile	6.18	54	56859	45.74	ug/L #	1
26) Vinyl Acetate	6.08	43	932866	46.17	ug/L	99
27) Chloroprene	6.28	53	664356	46.03	ug/L	95
28) Hexane	6.22	57	799966	52.41	ug/L	96

(#) = qualifier out of range (m) = manual integration

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:59 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
29)	2-Butanone (MEK)	6.44	43	206358	47.67	ug/L		95
30)	Diisopropyl Ether	6.37	45	1547325	50.08	ug/L		98
31)	Methacrylonitrile	6.61	67	183905	52.61	ug/L		85
32)	cis-1,2-Dichloroethene	6.71	61	564926	52.17	ug/L		94
33)	Ethyl Acetate	6.81	70	45767	45.96	ug/L	#	63
34)	Bromochloromethane	6.99	130	199746	53.82	ug/L		98
35)	Chloroform (C)	6.96	83	639794	52.57	ug/L		99
36)	2,2-Dichloropropane	6.82	77	499002	47.38	ug/L	#	89
38)	tert-Butyl Ethyl Ether	6.82	59	1355708	47.88	ug/L		93
39)	Isobutyl Alcohol	7.05	43	9574	33.25	ug/L	#	89
40)	Tetrahydrofuran	7.17	72	100388	99.57	ug/L		92
42)	1,2-Dichloroethane	7.72	62	506517	47.32	ug/L	#	81
43)	1,1,1-Trichloroethane	7.52	97	492309	47.16	ug/L		99
44)	1,1-Dichloropropene	7.74	75	535233	49.46	ug/L		98
45)	Cyclohexane	7.80	56	876827	52.48	ug/L		98
46)	Isopropyl Acetate	7.80	43	961393	48.66	ug/L		99
47)	Carbon Tetrachloride	7.86	117	401631	46.92	ug/L		99
48)	Benzene	7.89	78	1698338	56.45	ug/L		98
49)	tert-Amyl Methyl Ether	8.07	43	405751	44.10	ug/L		89
50)	Dibromomethane	8.81	93	230655	49.51	ug/L		95
51)	1,2-Dichloropropane (C)	8.69	63	480528	54.05	ug/L		96
52)	2-Nitropropane	8.95	43	350688	47.53	ug/L	#	93
53)	Trichloroethene	8.64	130	360112	50.39	ug/L		99
54)	Bromodichloromethane	8.87	83	522502	51.98	ug/L		99
55)	1,4-Dioxane	8.86	88	4366	44.74	ug/L	#	1
57)	Methyl Methacrylate	8.81	69	335699	50.99	ug/L	#	84
58)	n-Propyl Acetate	8.83	43	676599	49.42	ug/L		95
59)	Methyl Cyclohexane	9.02	83	853338	54.24	ug/L		95
60)	2-Chloroethyl Vinyl Ether	9.21	63	304560	51.95	ug/L		95
61)	cis-1,3-Dichloropropene	9.44	75	694991	53.44	ug/L		92
62)	4-Methyl-2-pentanone (MIBK	9.35	43	429658	47.72	ug/L		95
63)	trans-1,3-Dichloropropene	9.91	75	650021	51.62	ug/L		98
64)	1,1,2-Trichloroethane	10.06	83	325159	53.23	ug/L		96
66)	Toluene (C)	9.91	92	1068953	56.29	ug/L		98
67)	1,3-Dichloropropane	10.27	76	664994	52.51	ug/L		97
68)	Ethyl Methacrylate	10.09	69	591791	51.45	ug/L	#	80
69)	2-Hexanone	10.20	43	285418	46.72	ug/L		95
70)	Dibromochloromethane	10.54	129	356076	53.28	ug/L		97
71)	1,2-Dibromoethane (EDB)	10.75	107	327608	52.91	ug/L		100
72)	Tetrachloroethene	10.64	164	266889	51.31	ug/L		97
73)	1,1,1,2-Tetrachloroethane	11.35	131	321731	53.50	ug/L		99

(#) = qualifier out of range (m) = manual integration
1128-012.D 141118W.M Sun Nov 30 12:59:36 2014 Page 2

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:59 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

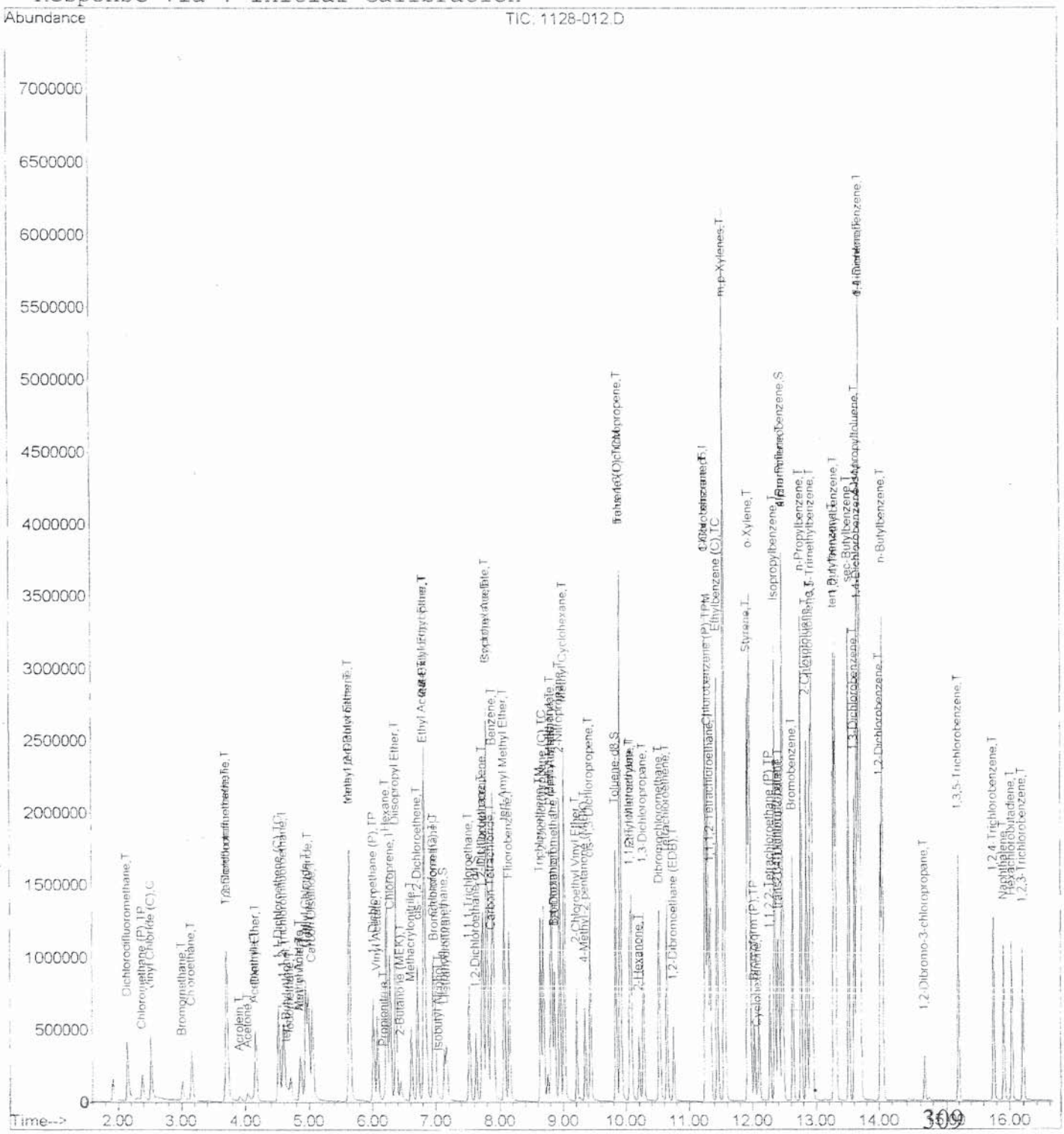
	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
74)	1-Chlorohexane	11.26	91	649146	52.87	ug/L		94
75)	Chlorobenzene (P)	11.30	112	1077547	57.58	ug/L		95
76)	Ethylbenzene (C)	11.45	106	610789	55.75	ug/L		98
77)	m,p-Xylenes	11.56	106	1628219	101.22	ug/L		96
78)	Bromoform (P)	12.03	173	208729	53.00	ug/L		99
79)	Cyclohexanone	12.08	55	28151	79.74	ug/L	#	20
80)	Styrene	11.92	104	1256703	56.10	ug/L		89
81)	1,1,2,2-Tetrachloroethane	12.28	83	460685	51.73	ug/L		100
82)	o-Xylene	11.95	106	743024	50.42	ug/L	#	93
83)	1,2,3-Trichloropropane	12.40	110	124301	51.26	ug/L	#	66
85)	trans-1,4-Dichloro-2-buten	12.42	53	146009	41.51	ug/L	#	1
86)	Isopropylbenzene	12.35	120	495821	50.15	ug/L		97
88)	alpha-Pinene	12.47	93	1056855	44.76	ug/L		99
89)	Bromobenzene	12.63	77	782290	45.68	ug/L	#	87
90)	n-Propylbenzene	12.76	120	533293	50.61	ug/L		86
91)	2-Chlorotoluene	12.85	126	415600m	53.01	ug/L		
92)	4-Chlorotoluene	12.91	126	436704	49.57	ug/L		92
93)	1,3,5-Trimethylbenzene	12.94	120	779119	50.04	ug/L		99
94)	tert-Butylbenzene	13.28	91	1018727m	42.11	ug/L		
95)	1,2,4-Trimethylbenzene	13.31	120	857589	48.83	ug/L	#	74
96)	sec-Butylbenzene	13.52	134	407991	50.36	ug/L		99
97)	1,3-Dichlorobenzene	13.61	146	785678	49.91	ug/L		98
98)	d-Limonene	13.70	68	811427	46.31	ug/L		96
99)	1,4-Dichlorobenzene	13.70	146	878915	51.76	ug/L		98
100)	4-Isopropyltoluene	13.66	134	479537	51.37	ug/L		92
101)	1,2-Dichlorobenzene	14.03	146	739503	49.51	ug/L		98
102)	n-Butylbenzene	14.06	92	1012650	50.25	ug/L		98
103)	1,2-Dibromo-3-chloropropan	14.67	157	73974	46.34	ug/L		84
104)	1,3,5-Trichlorobenzene	15.19	180	463602	48.27	ug/L		98
105)	1,2,4-Trichlorobenzene	15.75	180	342887	45.80	ug/L		98
106)	Naphthalene	15.91	128	785526	48.46	ug/L		100
107)	Hexachlorobutadiene	16.03	225	181108	46.27	ug/L		97
108)	1,2,3-Trichlorobenzene	16.20	180	276091	44.57	ug/L		97

(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 12:59 2014 Quant Results File: 141118W.RES

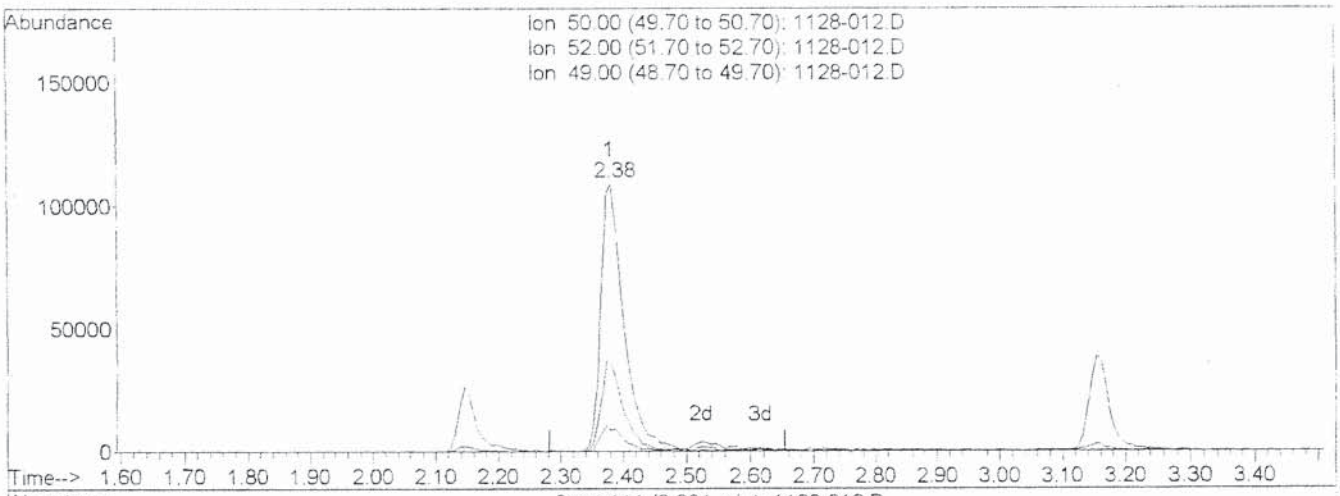
Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration

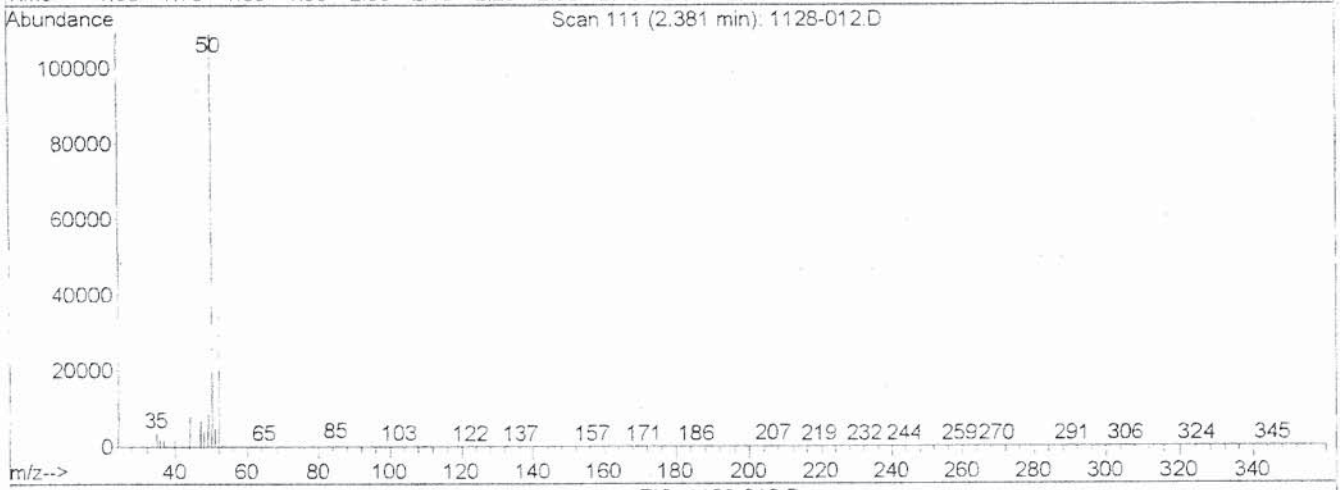


Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:59 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Sun Nov 30 13:06:13 2014
Response via : Multiple Level Calibration





TIC: 1128-012.D

(3) Chloromethane (P) (TP)

2.38min 25.39ug/L

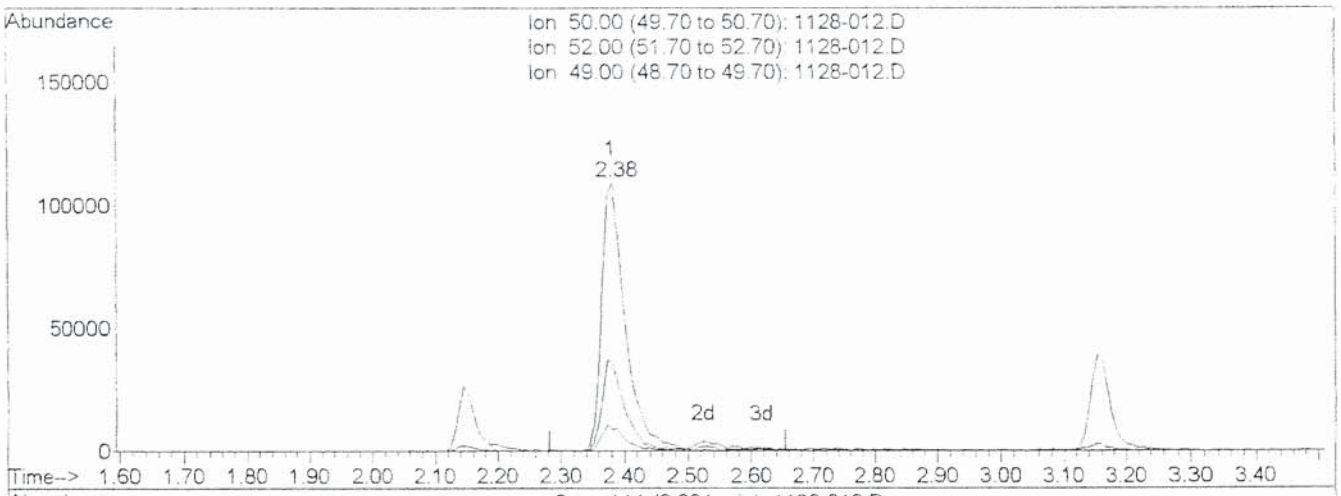
response 281126

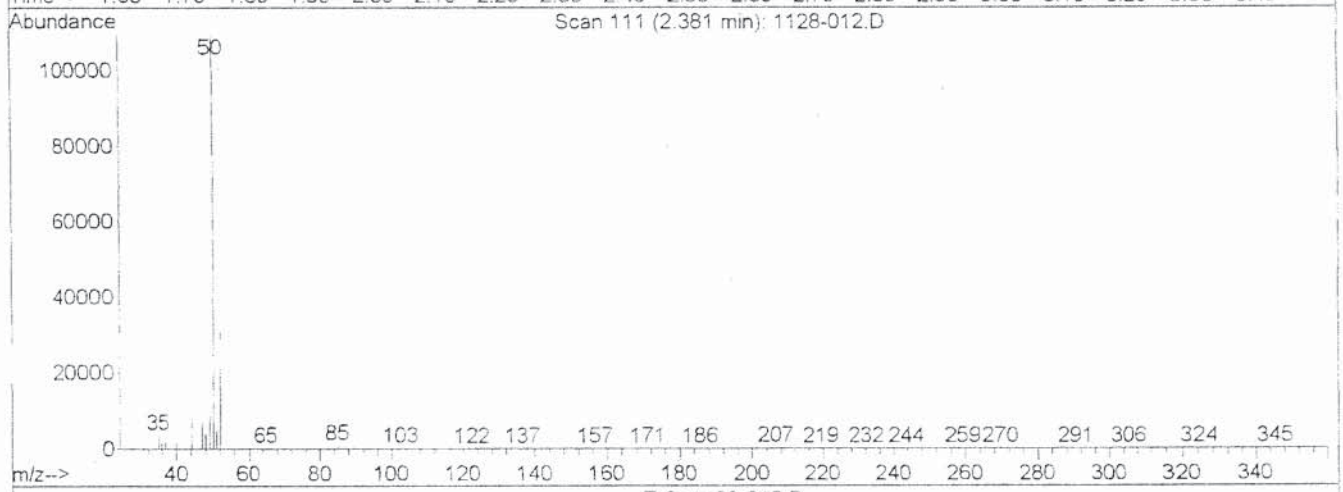
Ion	Exp%	Act%
50.00	100	100
52.00	31.10	33.23
49.00	9.60	9.87
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:07 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Sun Nov 30 13:06:13 2014
Response via : Multiple Level Calibration





TIC: 1128-012.D

(3) Chloromethane (P) (TP)

2.38min 26.15ug/L m

response 289551

Ion	Exp%	Act%
50.00	100	100
52.00	31.10	32.27
49.00	9.60	9.59
0.00	0.00	0.00

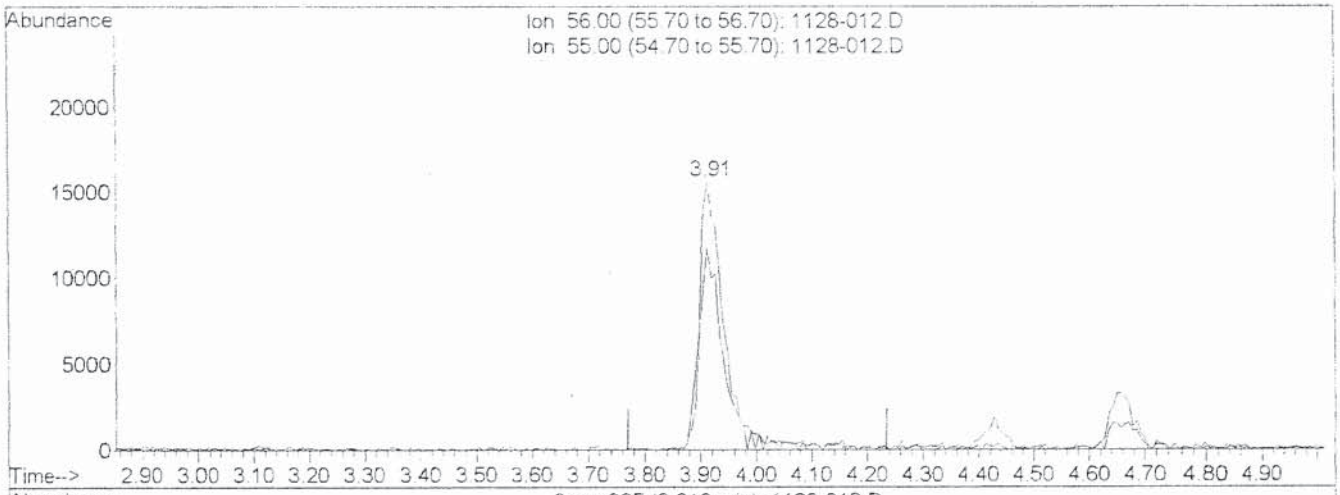
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DJU
DATE 1/6/15

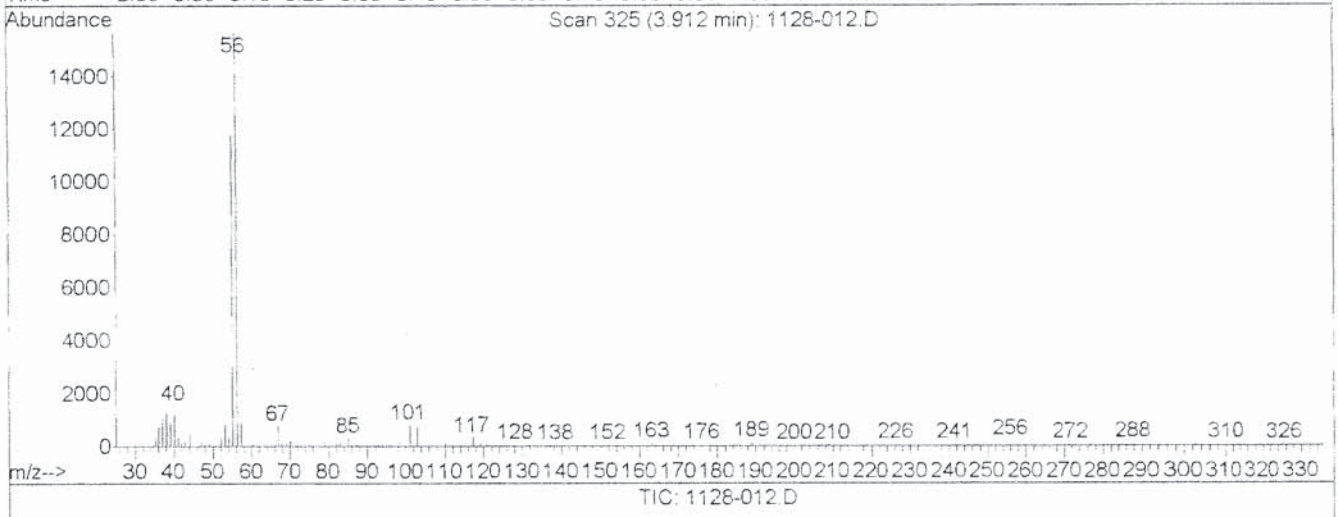
1128-012.D 141118W.M Sun Nov 30 13:07:24 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 28 19:36 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-012.D

(8) Acrolein (T)

3.91min 250.37ug/L

response 46639

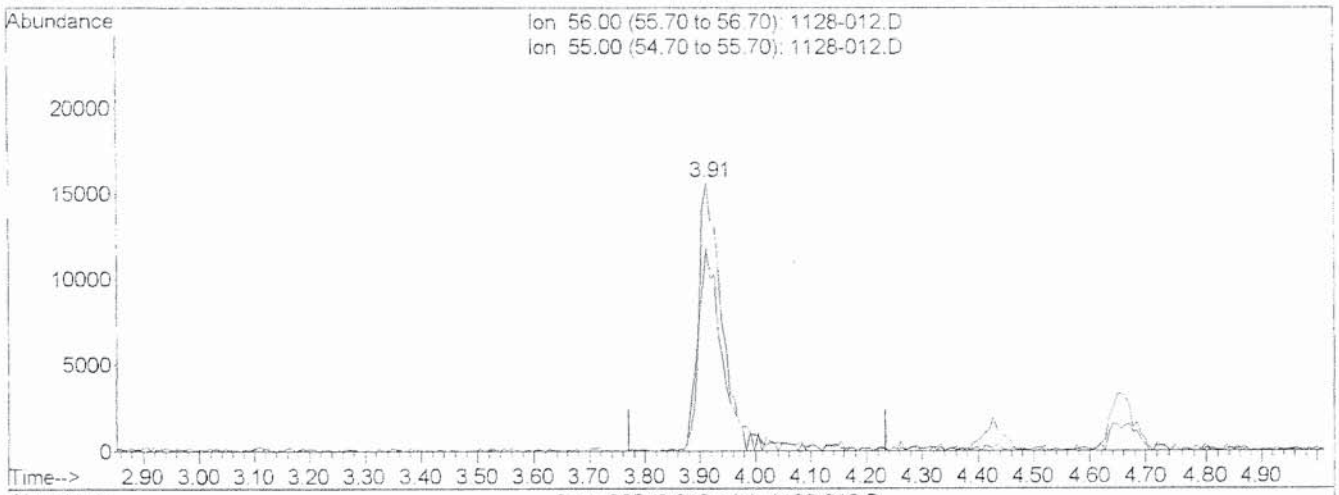
Ion	Exp%	Act%
56.00	100	100
55.00	72.90	70.46
0.00	0.00	0.00
0.00	0.00	0.00

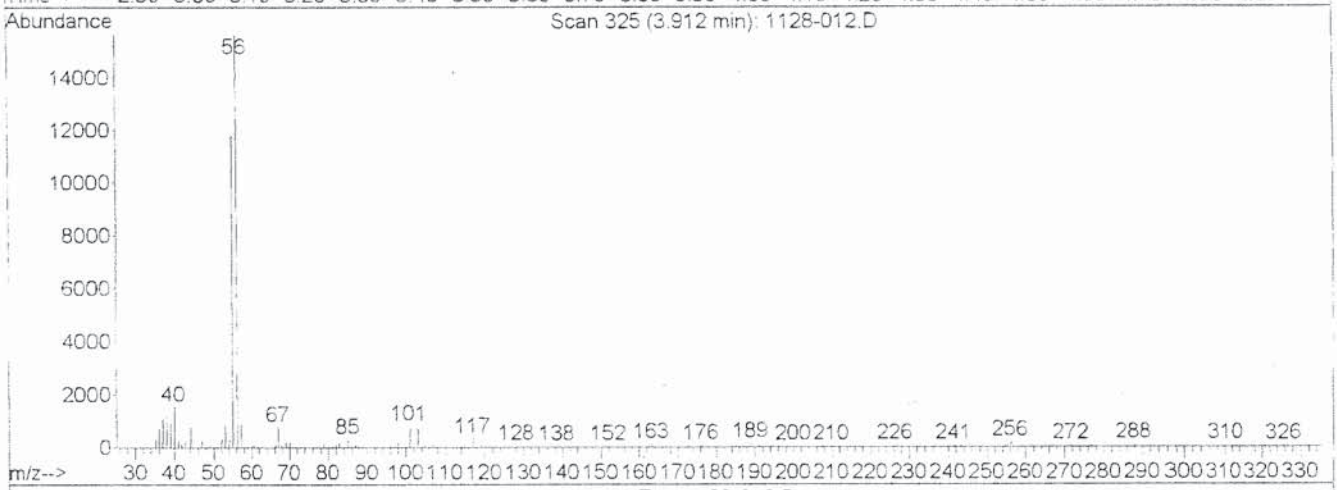
1128-012.D 141118W.M Sun Nov 30 12:58:02 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:58 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-012.D

(8) Acrolein (T)

3.91min 253.38ug/L m

response 48681

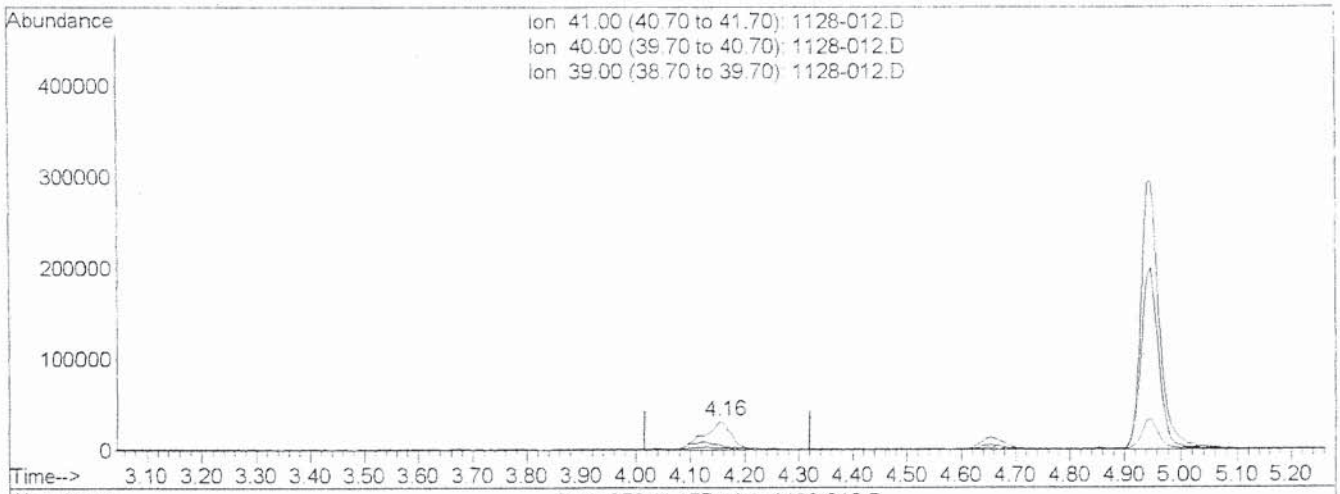
Ion	Exp%	Act%
56.00	100	100
55.00	72.90	67.50
0.00	0.00	0.00
0.00	0.00	0.00

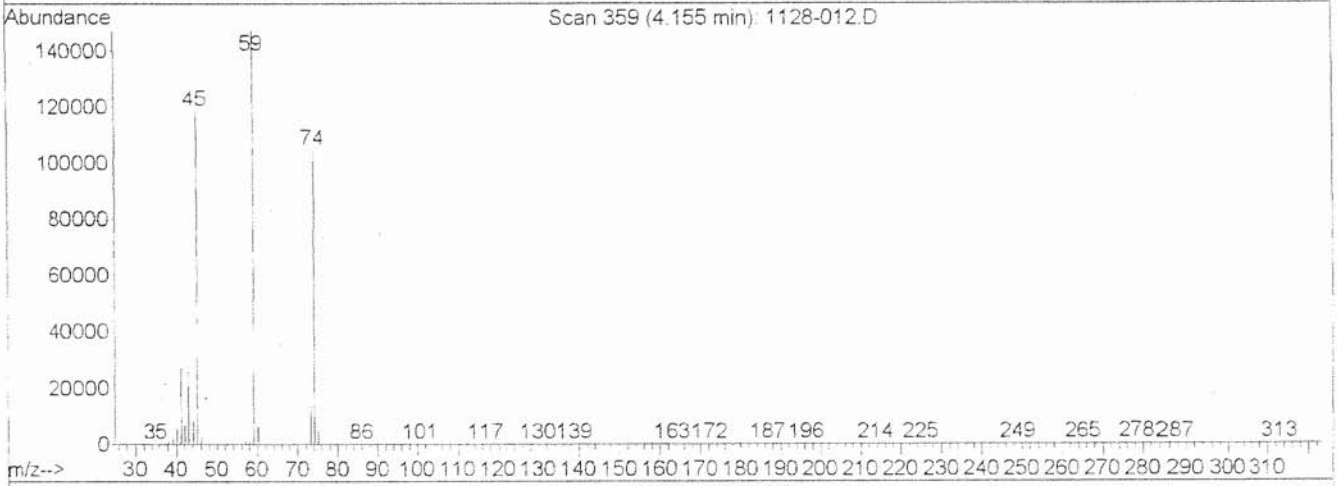
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DJG
DATE 11/6/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:58 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC 1128-012.D

(9) Acetonitrile (T)

4.16min 144.24ug/L

response 117987

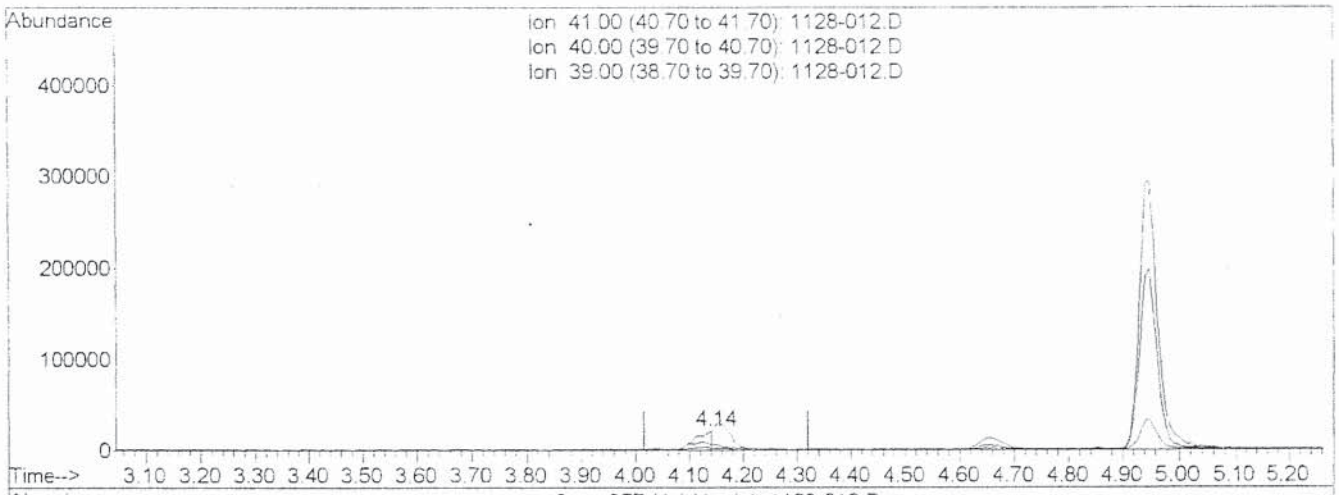
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	1.66#
39.00	15.40	2.48#
0.00	0.00	0.00

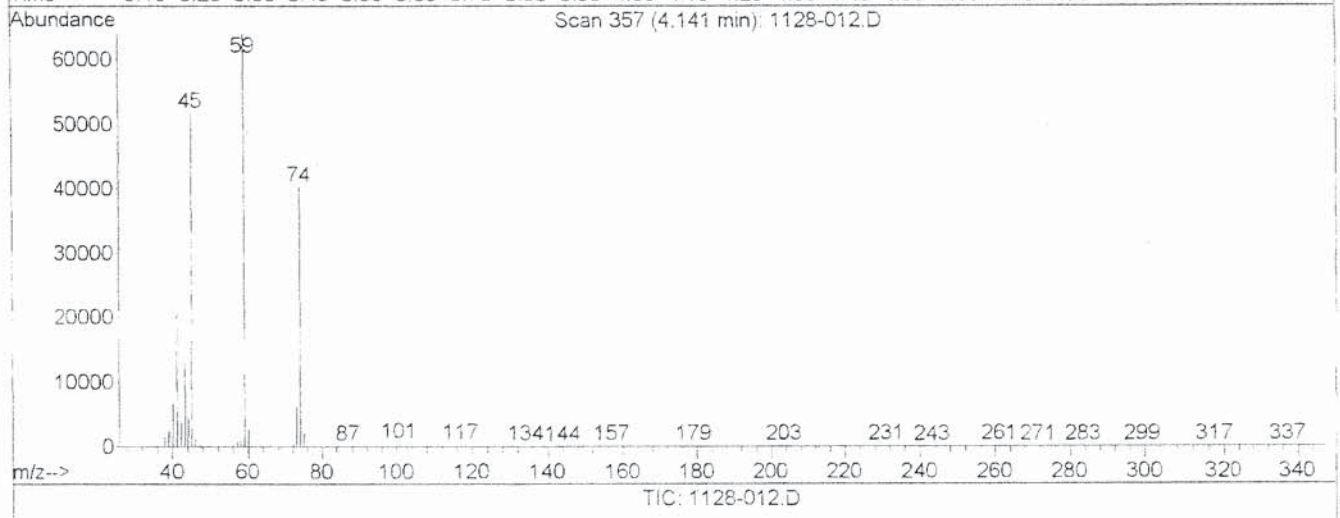
AMa

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:58 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-012.D

(9) Acetonitrile (T)

4.14min 56.80ug/L m

response 47709

Ion	Exp%	Act%
41.00	100	100
40.00	49.00	4.10#
39.00	15.40	6.13#
0.00	0.00	0.00

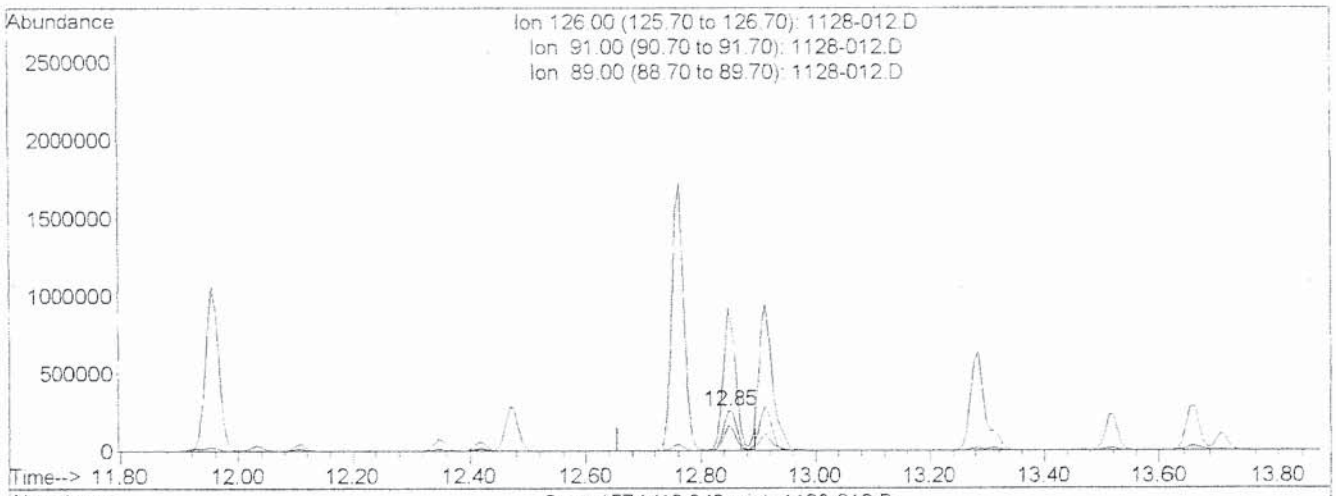
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1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 12/15

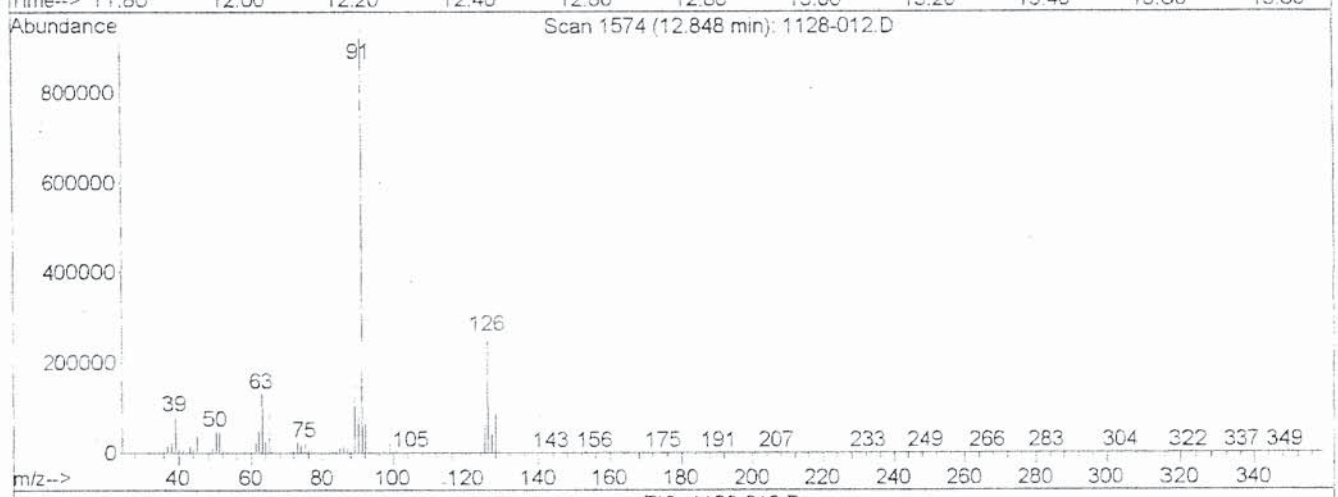
1128-012.D 141118W.M Sun Nov 30 12:58:13 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:58 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-012.D

(91) 2-Chlorotoluene (T)

12.85min 51.87ug/L

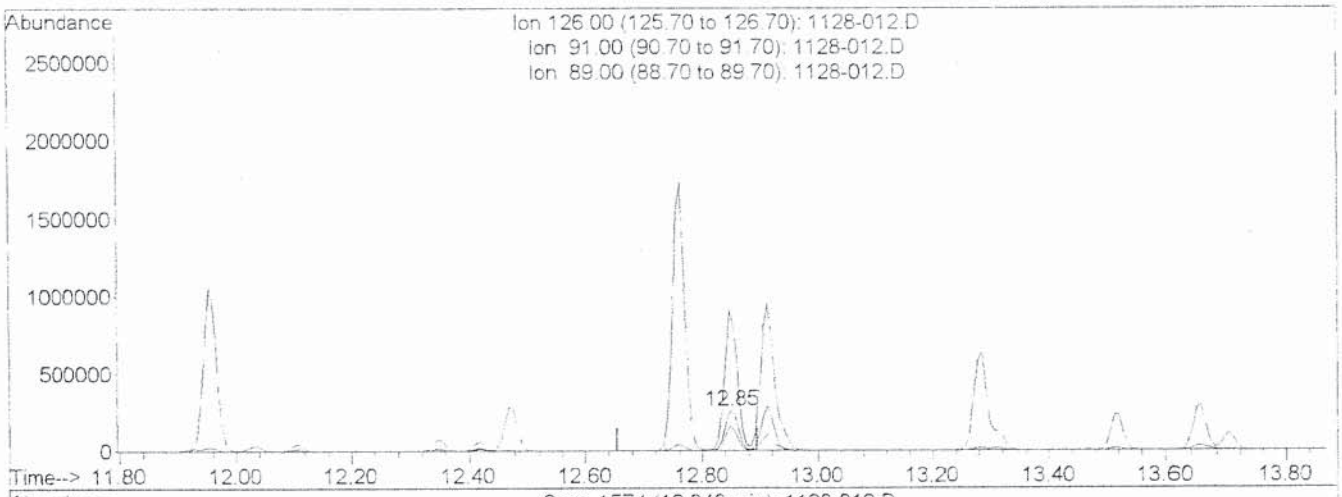
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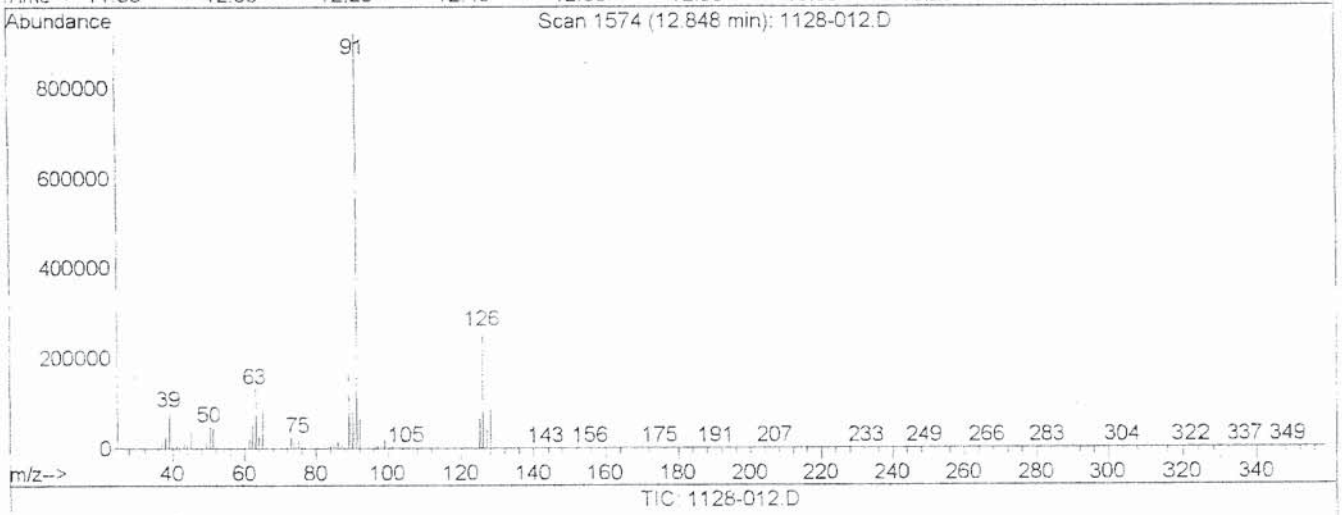
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	326.78
89.00	59.80	57.18
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:59 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-012.D

(91) 2-Chlorotoluene (T)

12.85min 53.01ug/L m

response 415600

Ion	Exp%	Act%
126.00	100	100
91.00	355.90	319.71
89.00	59.80	55.94
0.00	0.00	0.00

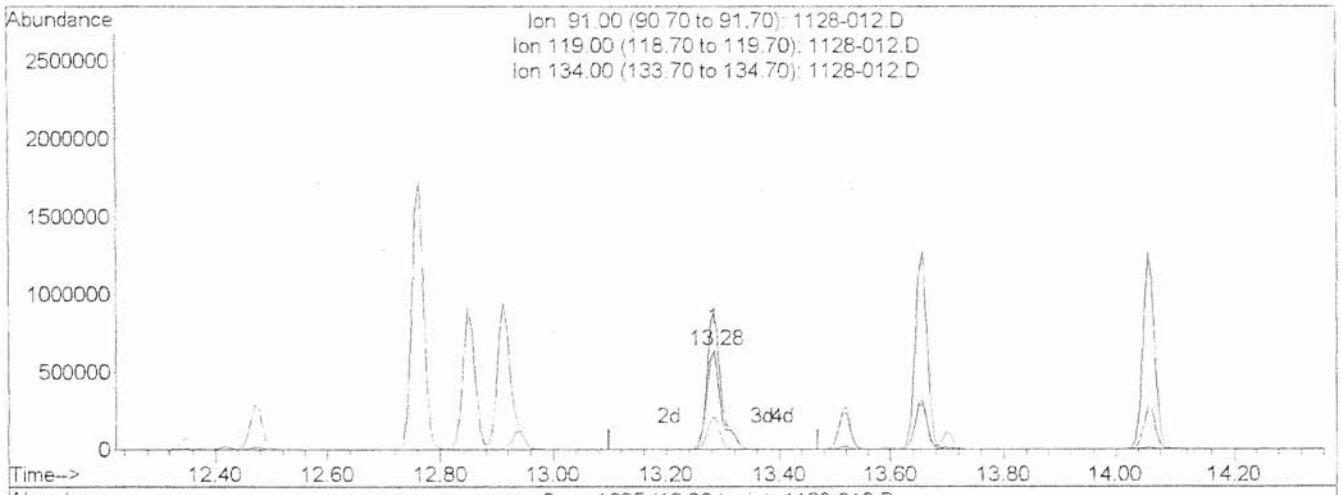
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
(2.) POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 11/30/15

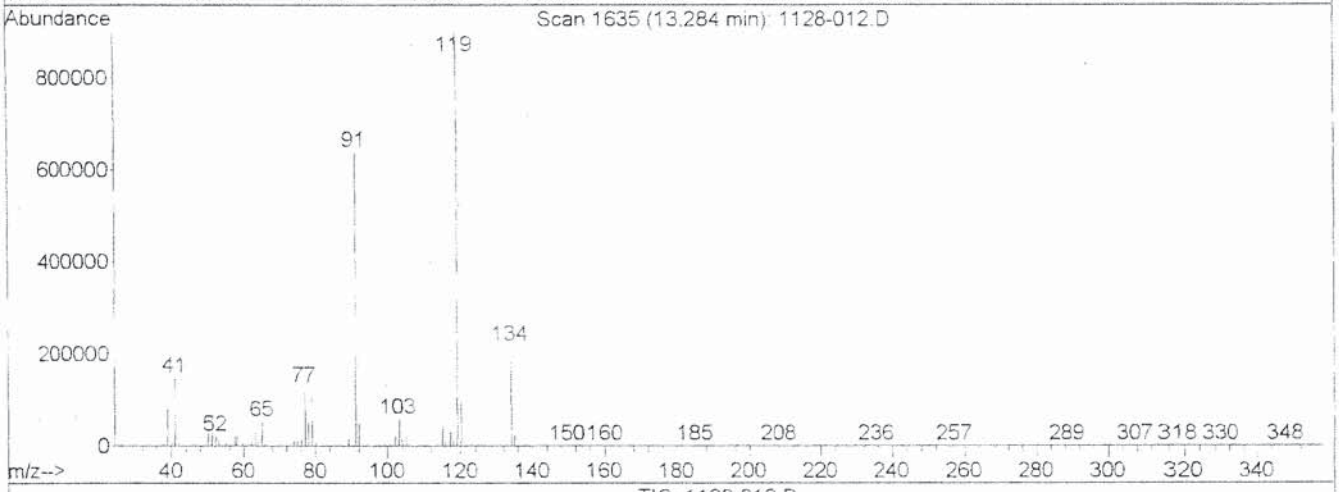
1128-012.D 141118W.M Sun Nov 30 12:59:13 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:59 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-012.D

(94) tert-Butylbenzene (T)

13.28min 46.96ug/L

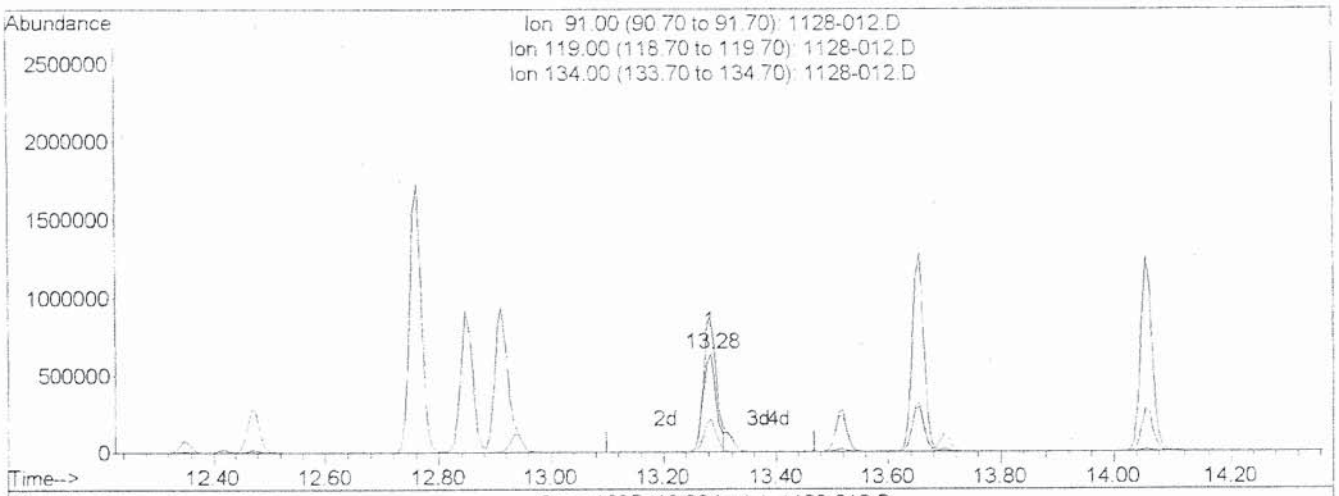
response 1136076

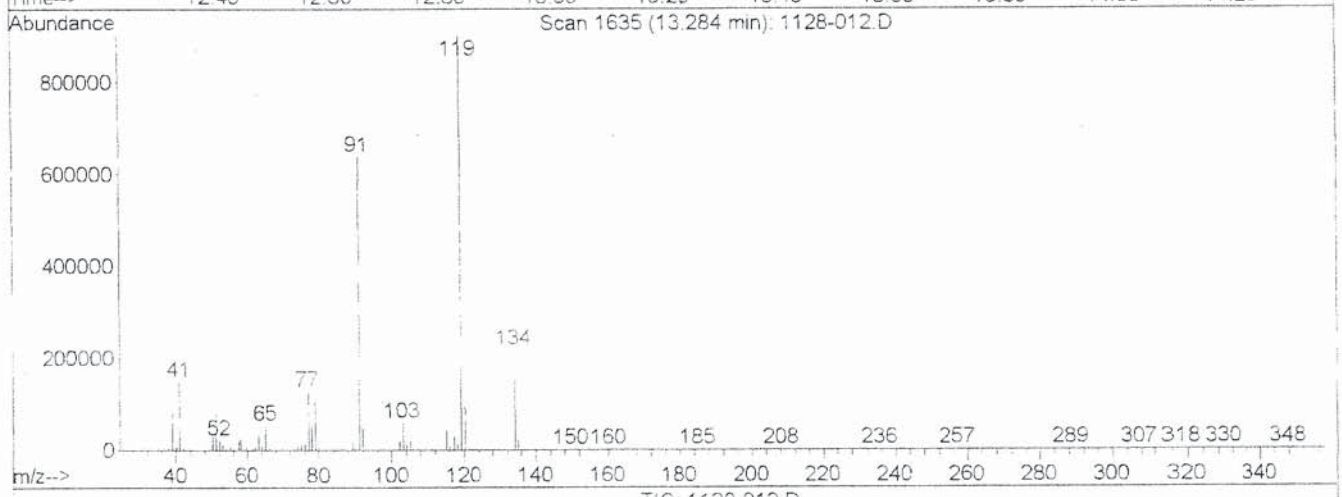
Ion	Exp%	Act%
91.00	100	100
119.00	136.80	137.47
134.00	31.60	28.66
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-012.D Vial: 8
Acq On : 28 Nov 2014 7:19 pm Operator: JDB
Sample : ICAL5 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:59 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-012.D

(94) tert-Butylbenzene (T)

13.28min 42.11ug/L m

response 1018727

Ion	Exp%	Act%
91.00	100	100
119.00	136.80	153.30
134.00	31.60	31.96
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DMG
DATE 12/10/15

1128-012.D 141118W.M Sun Nov 30 12:59:24 2014

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-014.D Vial: 10
Acq On : 28 Nov 2014 8:14 pm Operator: JDB
Sample : ICAL6 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:00 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Fluorobenzene	8.15	96	984690	50.00	ug/L	0.00
56) Chlorobenzene-d5	11.27	82	558952	50.00	ug/L	0.00
84) 1,4-Dichlorobenzene-d4	13.67	152	457404	50.00	ug/L	0.00
System Monitoring Compounds						
37) Dibromofluoromethane	7.13	111	218830	50.60	ug/L	0.00
Spiked Amount 50.000	Range 86 - 112		Recovery = 101.20%			
41) 1,2-Dichloroethane-d4	7.62	65	280924	43.16	ug/L	0.00
Spiked Amount 50.000	Range 72 - 121		Recovery = 86.32%			
65) Toluene-d8	9.84	98	1077208	47.41	ug/L	0.00
Spiked Amount 50.000	Range 88 - 115		Recovery = 94.82%			
87) 4-Bromofluorobenzene	12.47	95	483685	43.61	ug/L	0.00
Spiked Amount 50.000	Range 86 - 113		Recovery = 87.22%			
Target Compounds						Qvalue
2) Dichlorodifluoromethane	2.14	85	891599	96.92	ug/L	100
3) Chloromethane (P)	2.38	50	847332	75.26	ug/L	97
4) Vinyl Chloride (C)	2.52	62	921248	99.68	ug/L	97
5) Bromomethane	3.00	96	295107	74.23	ug/L	93
6) Chloroethane	3.15	64	811520	129.78	ug/L	95
7) 1,2-Dichlorotrifluoroethan	3.71	67	1032559	111.56	ug/L	98
8) Acrolein	3.91	56	90817	303.32	ug/L	96
9) Acetonitrile	4.14	41	113647m	136.50	ug/L	
10) Trichlorofluoromethane	3.70	101	1015037	103.81	ug/L	98
11) Acetone	4.03	43	255657	91.95	ug/L	93
12) Diethyl Ether	4.16	59	739932	100.35	ug/L	98
13) 1,1-Dichloroethene (C)	4.52	61	1204829	99.15	ug/L	98
14) tert-Butyl Alcohol	4.66	59	309482	415.73	ug/L #	89
15) Iodomethane	4.71	142	534345	96.00	ug/L	97
16) Acrylonitrile	4.87	53	353444	94.31	ug/L	98
17) Methylene Chloride	4.99	84	824747	113.31	ug/L	92
18) Methyl Acetate	4.85	43	756515	96.78	ug/L	98
19) Allyl Chloride	4.95	41	1436208	103.19	ug/L	94
20) 1,1,2-Trichlorotrifluoroet	4.59	101	630361	98.33	ug/L	96
21) Carbon Disulfide	5.05	76	2395362	114.19	ug/L	98
22) trans-1,2-Dichloroethene	5.64	61	1247730	113.04	ug/L	97
23) Methyl tert-Butyl Ether	5.64	73	2344561	101.11	ug/L	100
24) 1,1-Dichloroethane (P)	6.01	63	1554064	109.32	ug/L	99
25) Propionitrile	6.17	54	135016	92.21	ug/L #	1
26) Vinyl Acetate	6.08	43	1939570	94.41	ug/L	98
27) Chloroprene	6.28	53	1434530	97.85	ug/L	94
28) Hexane	6.22	57	1673481	107.84	ug/L	98

320

(#) = qualifier out of range (m) = manual integration
1128-014.D 141118W.M Sun Nov 30 13:01:07 2014 Page 1

AJM 1/6/15

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-014.D Vial: 10
Acq On : 28 Nov 2014 8:14 pm Operator: JDB
Sample : ICAL6 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:00 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Compound	R.T.	QIon	Response	Conc Unit	Qvalue
29) 2-Butanone (MEK)	6.44	43	447271	101.61 ug/L #	93
30) Diisopropyl Ether	6.37	45	3214107	102.31 ug/L	97
31) Methacrylonitrile	6.62	67	393958	110.85 ug/L	87
32) cis-1,2-Dichloroethene	6.72	61	1194654	108.49 ug/L	92
33) Ethyl Acetate	6.81	70	108011	106.68 ug/L #	83
34) Bromochloromethane	6.99	130	431150	114.25 ug/L	96
35) Chloroform (C)	6.97	83	1383730	111.81 ug/L	99
36) 2,2-Dichloropropane	6.82	77	1143293	106.76 ug/L #	90
38) tert-Butyl Ethyl Ether	6.83	59	3019516	104.88 ug/L	96
39) Isobutyl Alcohol	7.05	43	27183	84.38 ug/L #	96
40) Tetrahydrofuran	7.17	72	222678	217.21 ug/L	90
42) 1,2-Dichloroethane	7.72	62	1073326	98.61 ug/L #	82
43) 1,1,1-Trichloroethane	7.52	97	1061551	93.58 ug/L	99
44) 1,1-Dichloropropene	7.74	75	1170259	100.26 ug/L	97
45) Cyclohexane	7.80	56	1902953	112.01 ug/L	96
46) Isopropyl Acetate	7.80	43	2072291	103.15 ug/L	98
47) Carbon Tetrachloride	7.86	117	878359	92.62 ug/L	98
48) Benzene	7.90	78	3761949	122.97 ug/L	98
49) tert-Amyl Methyl Ether	8.07	43	840018	89.79 ug/L	81
50) Dibromomethane	8.80	93	523763	100.00 ug/L	94
51) 1,2-Dichloropropane (C)	8.69	63	1024379	113.33 ug/L	96
52) 2-Nitropropane	8.95	43	742460	98.97 ug/L #	97
53) Trichloroethene	8.65	130	829028	101.72 ug/L	99
54) Bromodichloromethane	8.87	83	1137316	111.28 ug/L	98
55) 1,4-Dioxane	8.85	88	10187	102.68 ug/L #	1
57) Methyl Methacrylate	8.81	69	773544	103.79 ug/L	88
58) n-Propyl Acetate	8.83	43	1464139	94.47 ug/L	96
59) Methyl Cyclohexane	9.03	83	1868975	104.94 ug/L	97
60) 2-Chloroethyl Vinyl Ether	9.21	63	661794	99.72 ug/L #	95
61) cis-1,3-Dichloropropene	9.43	75	1542297	104.75 ug/L	95
62) 4-Methyl-2-pentanone (MIBK	9.36	43	938451	92.07 ug/L #	94
63) trans-1,3-Dichloropropene	9.91	75	1546007	108.45 ug/L	92
64) 1,1,2-Trichloroethane	10.06	83	731401	105.77 ug/L	95
66) Toluene (C)	9.91	92	2556277	118.90 ug/L	99
67) 1,3-Dichloropropane	10.27	76	1460623	101.88 ug/L	98
68) Ethyl Methacrylate	10.09	69	1314666	100.97 ug/L #	78
69) 2-Hexanone	10.20	43	639091	92.41 ug/L	95
70) Dibromochloromethane	10.54	129	822943	108.77 ug/L	97
71) 1,2-Dibromoethane (EDB)	10.75	107	738310	105.33 ug/L	99
72) Tetrachloroethene	10.65	164	626344	98.27 ug/L	96
73) 1,1,1,2-Tetrachloroethane	11.34	131	751709	110.42 ug/L	99

(#) = qualifier out of range (m) = manual integration

Data File : I:\MS52\DATA\MS52-141128\1128-014.D Vial: 10
Acq On : 28 Nov 2014 8:14 pm Operator: JDB
Sample : ICAL6 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:00 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

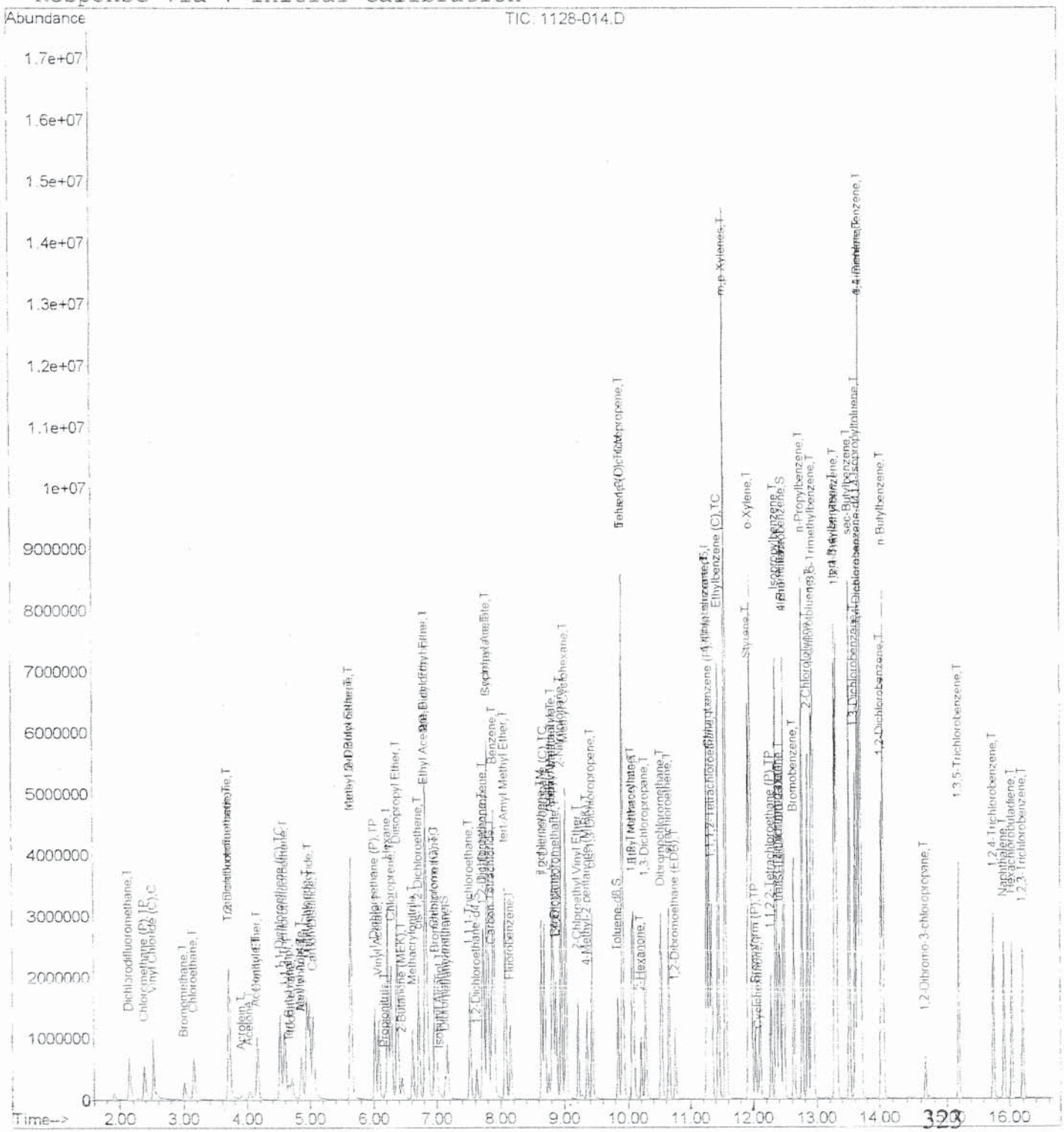
	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
74)	1-Chlorohexane	11.26	91	1506985	108.43	ug/L		92
75)	Chlorobenzene (P)	11.31	112	2486692	117.39	ug/L		94
76)	Ethylbenzene (C)	11.45	106	1431365	115.41	ug/L		97
77)	m,p-Xylenes	11.56	106	4147763	219.49	ug/L		93
78)	Bromoform (P)	12.04	173	490264	109.97	ug/L		100
79)	Cyclohexanone	12.08	55	68663	202.47	ug/L	#	29
80)	Styrene	11.92	104	3013287	118.82	ug/L		91
81)	1,1,2,2-Tetrachloroethane	12.27	83	997418	98.93	ug/L		99
82)	o-Xylene	11.96	106	1807039	102.86	ug/L	#	91
83)	1,2,3-Trichloropropane	12.40	110	278997	101.63	ug/L	#	57
85)	trans-1,4-Dichloro-2-buten	12.42	53	339291	83.16	ug/L	#	1
86)	Isopropylbenzene	12.35	120	1207804	105.32	ug/L		99
88)	alpha-Pinene	12.48	93	2417937	88.28	ug/L		98
89)	Bromobenzene	12.63	77	1812569	91.24	ug/L	#	85
90)	n-Propylbenzene	12.76	120	1277857	104.56	ug/L		85
91)	2-Chlorotoluene	12.85	126	977906m	107.55	ug/L		
92)	4-Chlorotoluene	12.91	126	1082610	105.94	ug/L		98
93)	1,3,5-Trimethylbenzene	12.94	120	1898727	105.13	ug/L		99
94)	tert-Butylbenzene	13.28	91	2539972m	90.51	ug/L		
95)	1,2,4-Trimethylbenzene	13.31	120	2109883	103.57	ug/L	#	73
96)	sec-Butylbenzene	13.52	134	991291	105.50	ug/L		99
97)	1,3-Dichlorobenzene	13.61	146	1923129	105.33	ug/L		97
98)	d-Limonene	13.70	68	1978801	97.37	ug/L	#	93
99)	1,4-Dichlorobenzene	13.71	146	2338064	118.70	ug/L		96
100)	4-Isopropyltoluene	13.66	134	1172528	108.29	ug/L		92
101)	1,2-Dichlorobenzene	14.03	146	1765744	101.92	ug/L		98
102)	n-Butylbenzene	14.06	92	2438420	104.33	ug/L		99
103)	1,2-Dibromo-3-chloropropan	14.67	157	165472	89.38	ug/L		84
104)	1,3,5-Trichlorobenzene	15.19	180	1118651	100.41	ug/L		98
105)	1,2,4-Trichlorobenzene	15.75	180	852960	98.23	ug/L		97
106)	Naphthalene	15.91	128	1870613	99.49	ug/L		99
107)	Hexachlorobutadiene	16.04	225	430811	94.90	ug/L		99
108)	1,2,3-Trichlorobenzene	16.20	180	683980	93.18	ug/L		98

(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : I:\MS52\DATA\MS52-141128\1128-014.D Vial: 10
Acq On : 28 Nov 2014 8:14 pm Operator: JDB
Sample : ICAL6 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:00 2014 Quant Results File: 141118W.RES

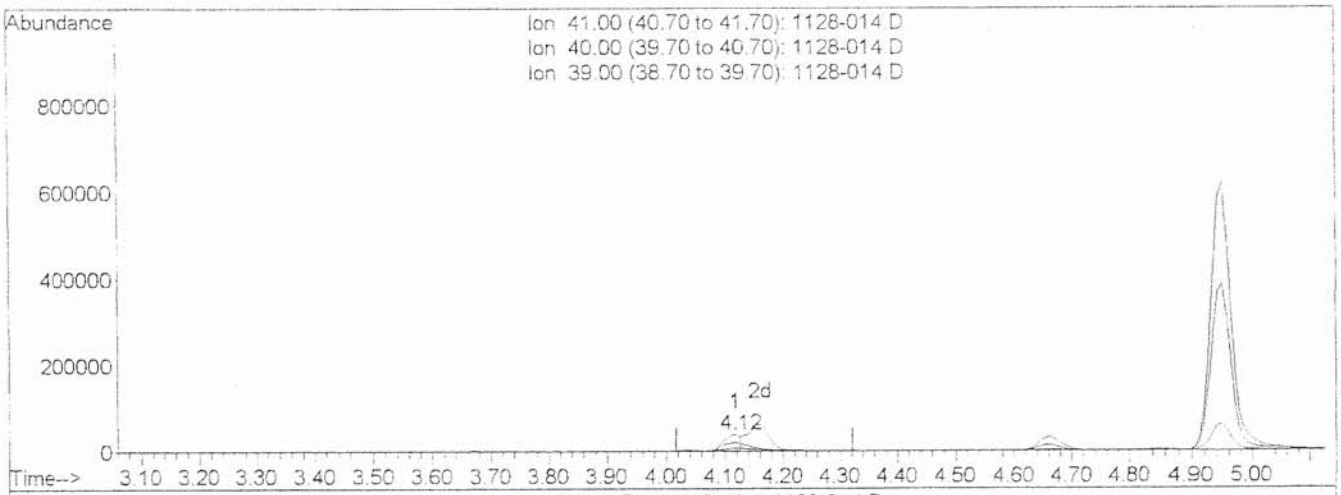
Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration

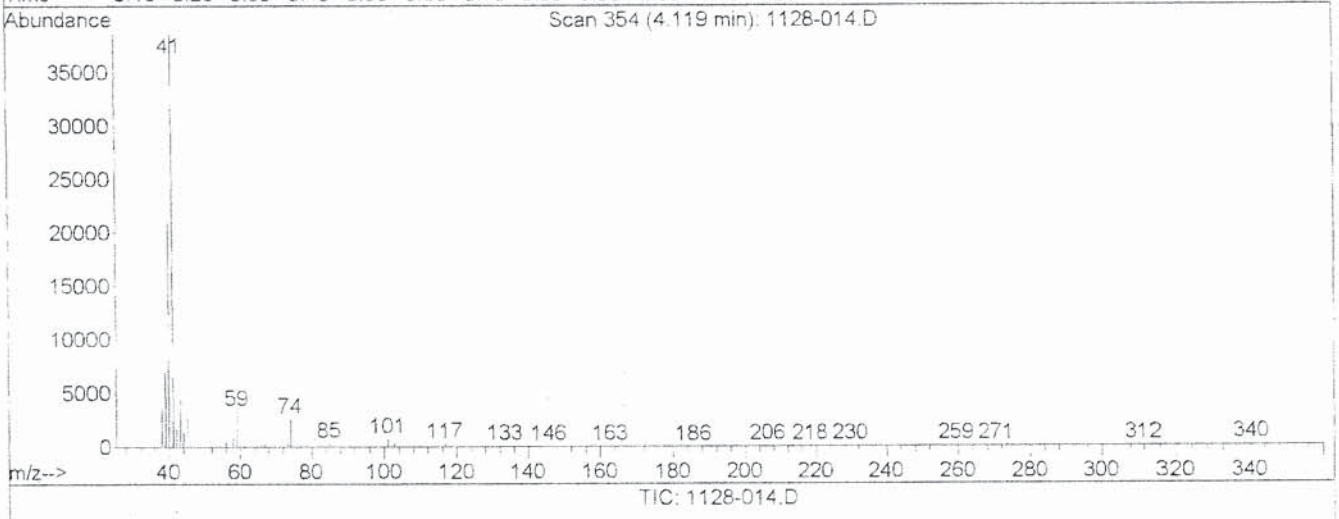


Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-014.D Vial: 10
Acq On : 28 Nov 2014 8:14 pm Operator: JDB
Sample : ICAL6 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 28 20:30 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-014.D

(9) Acetonitrile (T)

4.12min 92.91ug/L

response 78019

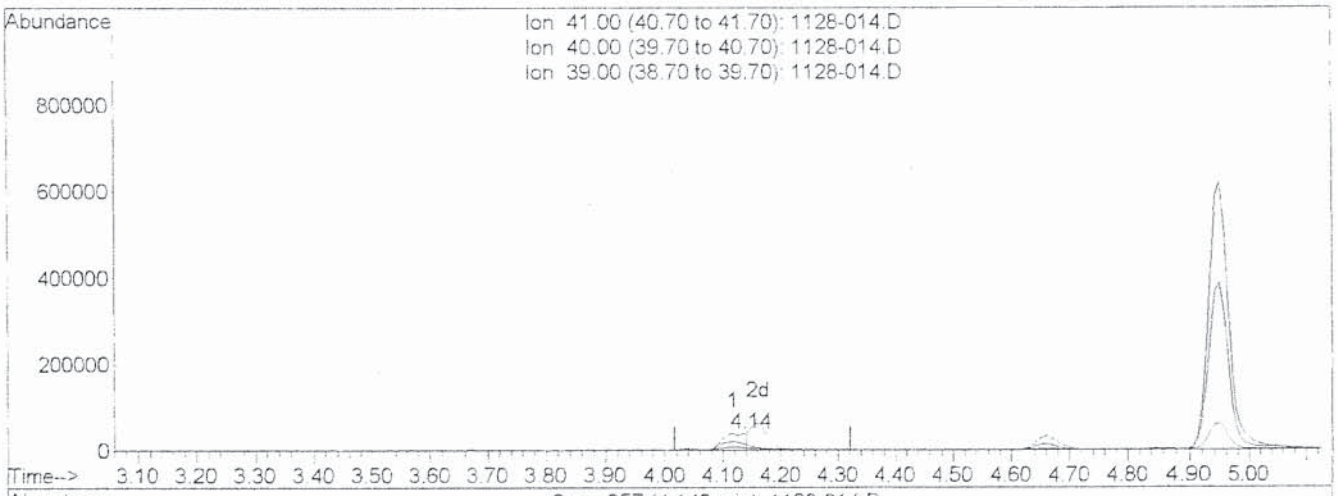
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	86.09#
39.00	15.40	40.67#
0.00	0.00	0.00

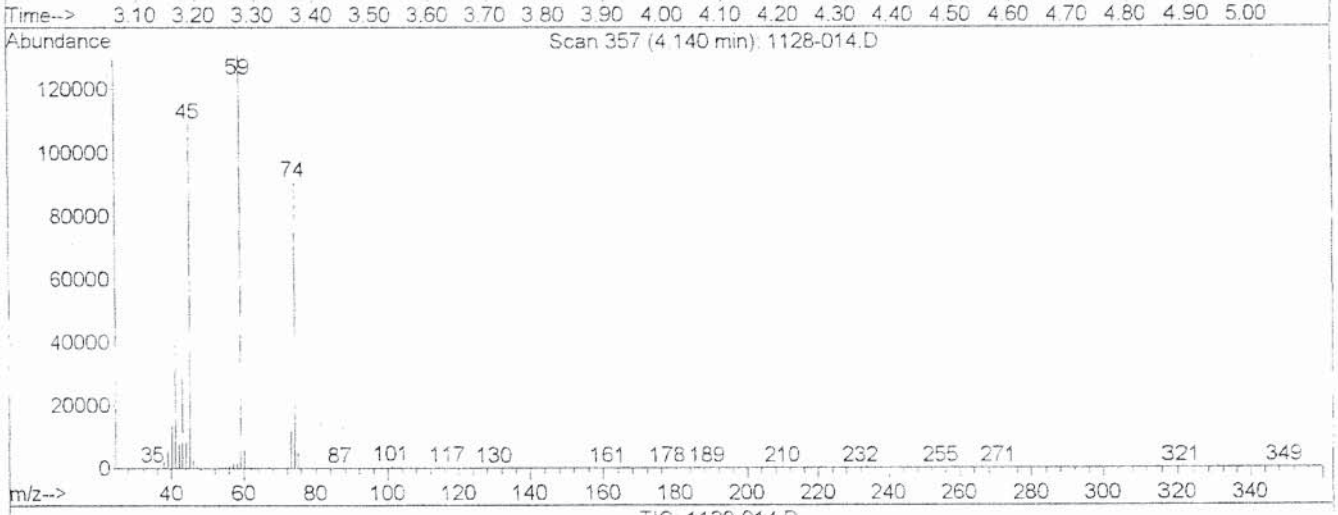
AMa

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-014.D Vial: 10
Acq On : 28 Nov 2014 8:14 pm Operator: JDB
Sample : ICAL6 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:59 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-014.D

(9) Acetonitrile (T)

4.14min 136.50ug/L m

response 113647

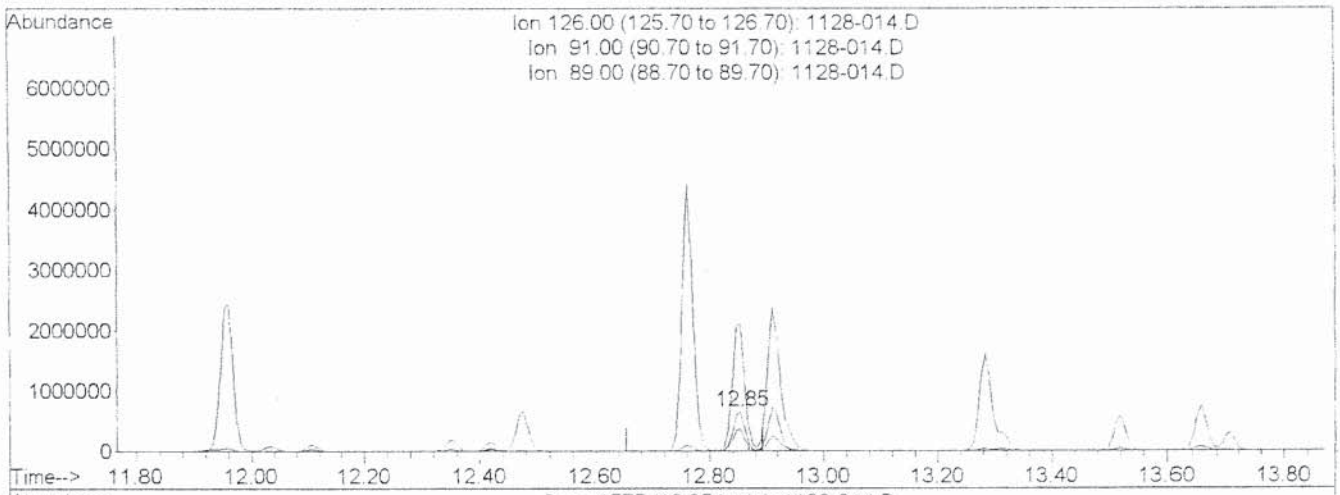
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	59.10#
39.00	15.40	27.92#
0.00	0.00	0.00

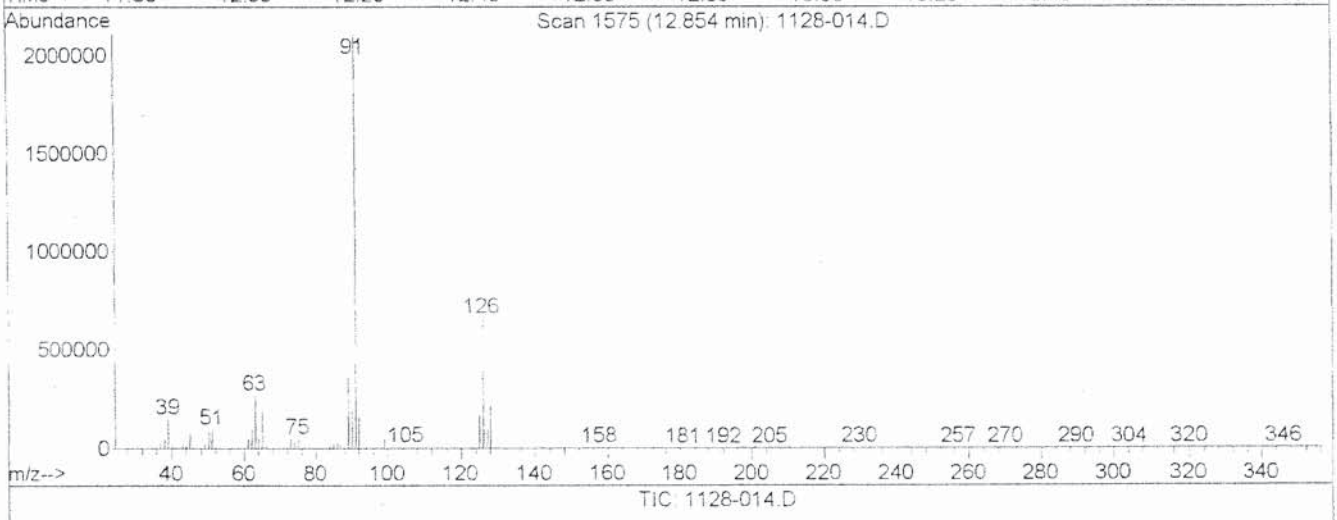
MANUAL EDIT CODES
1: WRONG PEAK SELECTED
2: POOR INTEGRATION
3: PEAK NOT FOUND
4: OTHER
ANALYST JJU
DATE 1/16/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-014.D Vial: 10
Acq On : 28 Nov 2014 8:14 pm Operator: JDB
Sample : ICAL6 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 12:59 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-014.D

(91) 2-Chlorotoluene (T)

12.85min 105.13ug/L

response 955955

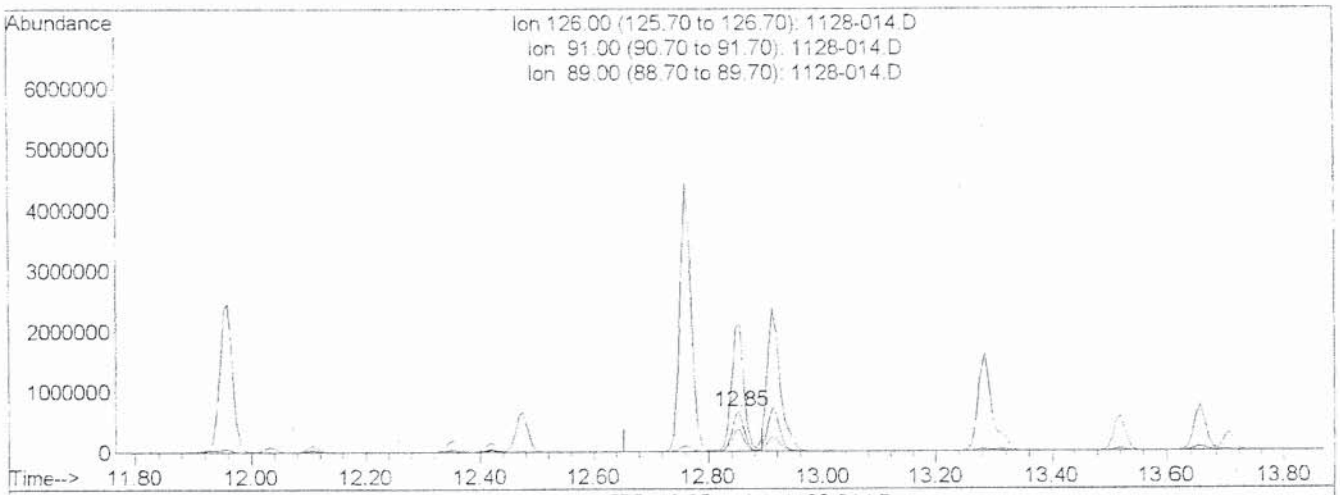
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	325.30
89.00	59.80	56.38
0.00	0.00	0.00

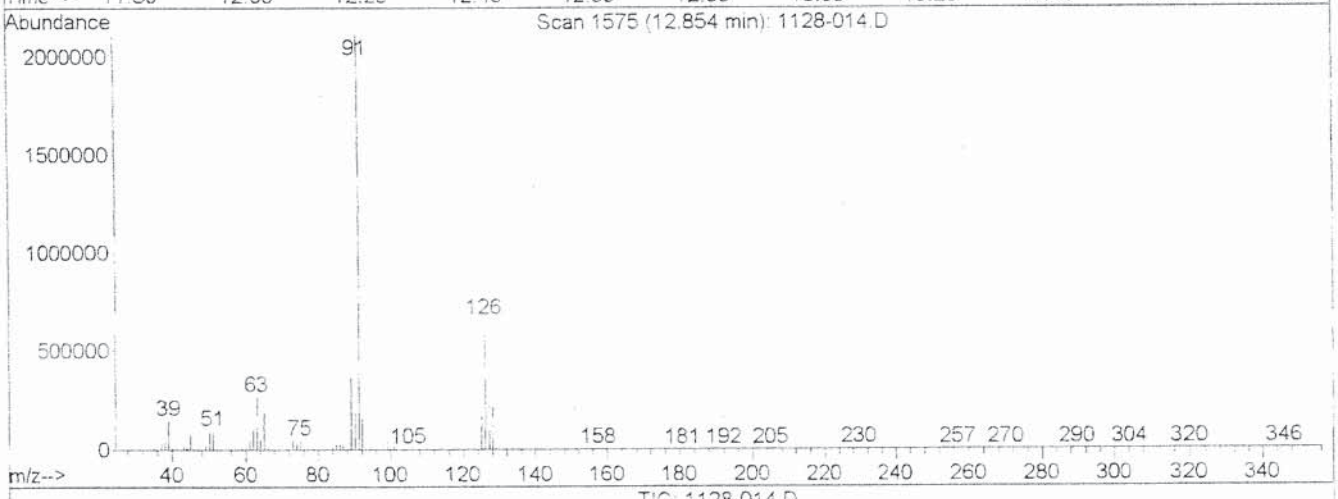
JMG

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-014.D Vial: 10
Acq On : 28 Nov 2014 8:14 pm Operator: JDB
Sample : ICAL6 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:00 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-014.D

(91) 2-Chlorotoluene (T)

12.85min 107.55ug/L m

response 977906

Ion	Exp%	Act%
126.00	100	100
91.00	355.90	317.99
89.00	59.80	55.11
0.00	0.00	0.00

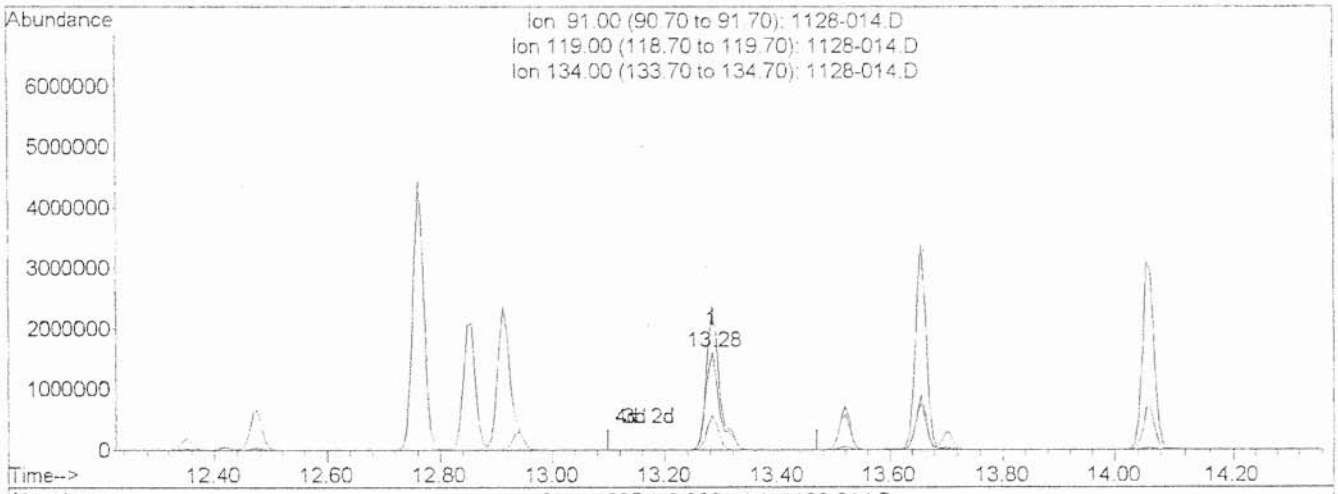
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 11/6/15

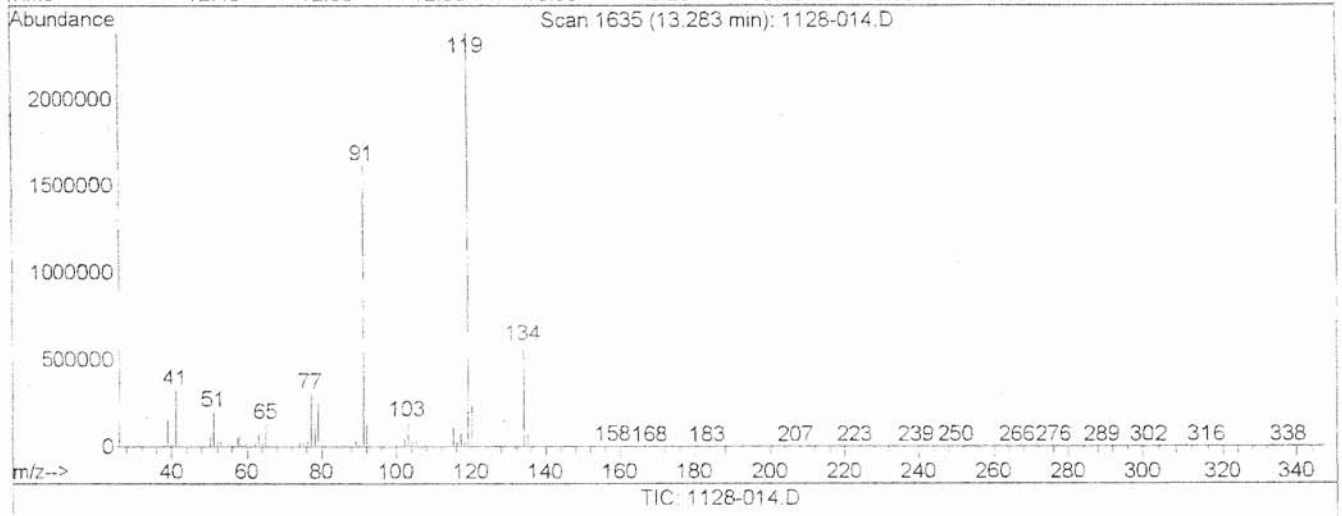
1128-014.D 141118W.M Sun Nov 30 13:00:42 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-014.D Vial: 10
Acq On : 28 Nov 2014 8:14 pm Operator: JDB
Sample : ICAL6 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:00 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-014.D

(94) tert-Butylbenzene (T)

13.28min 96.71ug/L

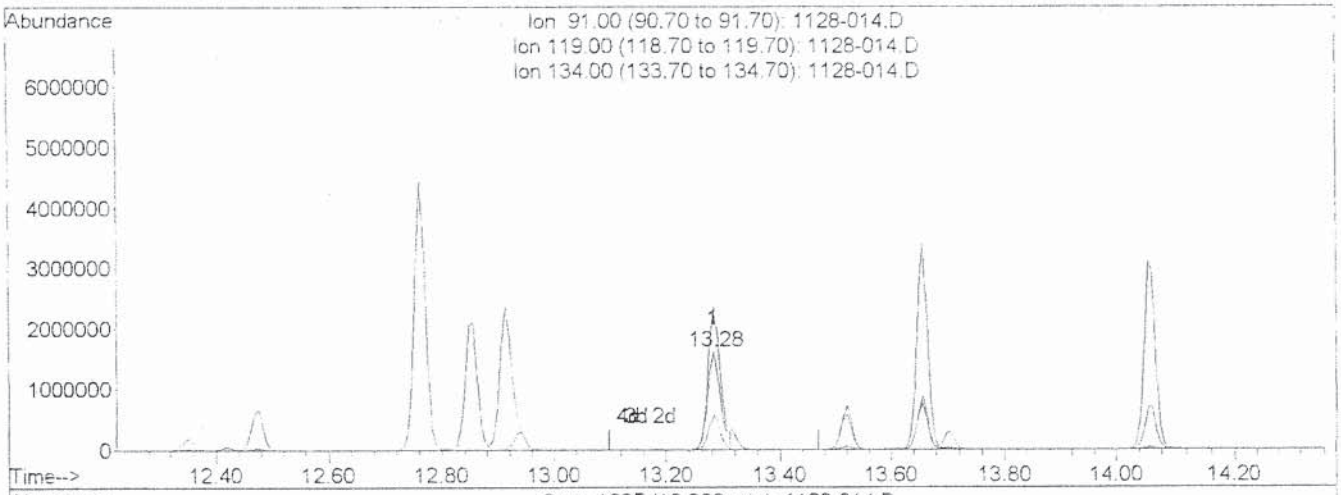
response 2713921

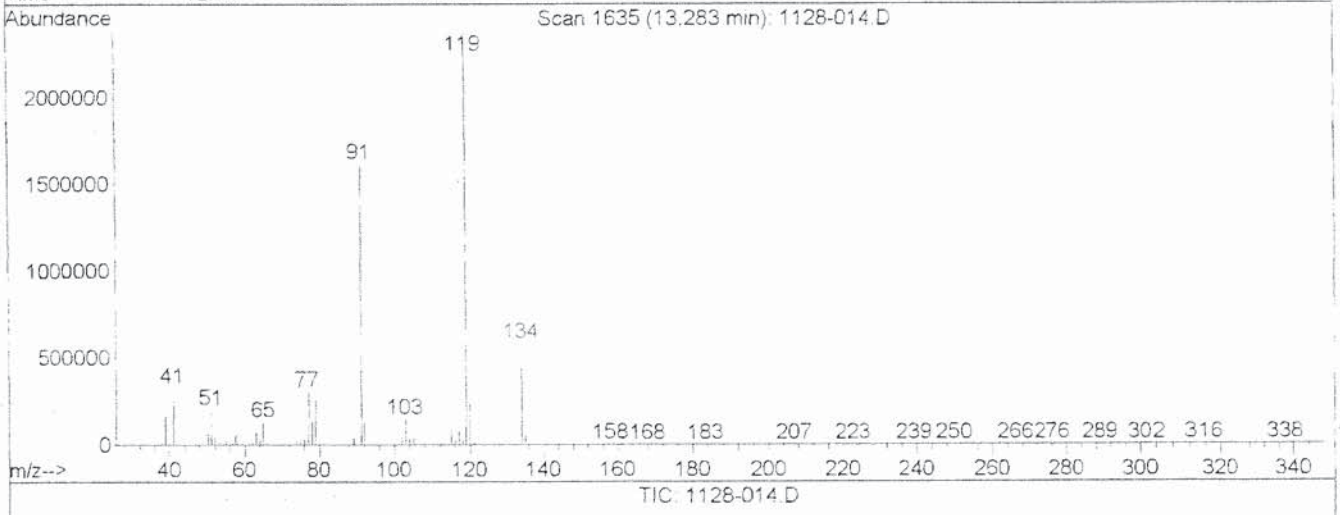
Ion	Exp%	Act%
91.00	100	100
119.00	136.80	141.94
134.00	31.60	29.86
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-014.D Vial: 10
Acq On : 28 Nov 2014 8:14 pm Operator: JDB
Sample : ICAL6 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:00 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-014.D

(94) tert-Butylbenzene (T)

13.28min 90.51ug/L m

response 2539972

ion	Exp%	Act%
91.00	100	100
119.00	136.80	151.66
134.00	31.60	31.90
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DJW
DATE 11/01/15

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-016.D Vial: 12
Acq On : 28 Nov 2014 9:08 pm Operator: JDB
Sample : ICAL7 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:02 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Fluorobenzene	8.15	96	1046538	50.00	ug/L	0.00
56) Chlorobenzene-d5	11.27	82	638322	50.00	ug/L	0.00
84) 1,4-Dichlorobenzene-d4	13.67	152	563814	50.00	ug/L	0.00
System Monitoring Compounds						
37) Dibromofluoromethane	7.13	111	231649	50.39	ug/L	0.00
Spiked Amount 50.000	Range 86 - 112		Recovery = 100.78%			
41) 1,2-Dichloroethane-d4	7.63	65	299136	43.24	ug/L	0.00
Spiked Amount 50.000	Range 72 - 121		Recovery = 86.48%			
65) Toluene-d8	9.84	98	1151783	44.39	ug/L	0.00
Spiked Amount 50.000	Range 88 - 115		Recovery = 88.78%			
87) 4-Bromofluorobenzene	12.47	95	616805	45.12	ug/L	0.00
Spiked Amount 50.000	Range 86 - 113		Recovery = 90.24%			
Target Compounds						Qvalue
2) Dichlorodifluoromethane	2.14	85	1900738	194.40	ug/L	98
3) Chloromethane (P)	2.37	50	1946808	162.70	ug/L	96
4) Vinyl Chloride (C)	2.52	62	1901822	193.62	ug/L	98
5) Bromomethane	3.00	96	796506	175.90	ug/L	91
6) Chloroethane	3.14	64	1664414	250.45	ug/L	94
7) 1,2-Dichlorotrifluoroethan	3.70	67	2351096	239.00	ug/L	96
8) Acrolein	3.90	56	333596	465.11	ug/L	95
9) Acetonitrile	4.13	41	204687m	233.09	ug/L	
10) Trichlorofluoromethane	3.69	101	2275833	219.01	ug/L	99
11) Acetone	4.03	43	541835	183.41	ug/L	94
12) Diethyl Ether	4.16	59	1669447	213.04	ug/L	95
13) 1,1-Dichloroethene (C)	4.51	61	2596040	199.26	ug/L	96
14) tert-Butyl Alcohol	4.68	59	718824	908.54	ug/L	95
15) Iodomethane	4.70	142	1236826	208.71	ug/L	94
16) Acrylonitrile	4.86	53	772889	189.66	ug/L	98
17) Methylene Chloride	4.99	84	1820919	235.38	ug/L	89
18) Methyl Acetate	4.85	43	1602190	192.86	ug/L	96
19) Allyl Chloride	4.94	41	2902935	196.25	ug/L #	91
20) 1,1,2-Trichlorotrifluoroet	4.58	101	1397655	199.58	ug/L	97
21) Carbon Disulfide	5.04	76	5274491	236.58	ug/L	99
22) trans-1,2-Dichloroethene	5.64	61	2848027	242.77	ug/L	92
23) Methyl tert-Butyl Ether	5.64	73	5645070	229.05	ug/L	99
24) 1,1-Dichloroethane (P)	6.01	63	3407676	225.56	ug/L	99
25) Propionitrile	6.18	54	299944	180.80	ug/L #	1
26) Vinyl Acetate	6.08	43	4335850	198.57	ug/L	97
27) Chloroprene	6.27	53	3109441	199.66	ug/L	92
28) Hexane	6.22	57	3841221	232.89	ug/L	97

(#) = qualifier out of range (m) = manual integration

1128-016.D 141118W.M Sun Nov 30 13:02:47 2014

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-016.D Vial: 12
Acq On : 28 Nov 2014 9:08 pm Operator: JDB
Sample : ICAL7 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:02 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
29)	2-Butanone (MEK)	6.44	43	928531	198.47	ug/L	#	92
30)	Diisopropyl Ether	6.37	45	7116917	213.15	ug/L		95
31)	Methacrylonitrile	6.62	67	880292	233.05	ug/L		84
32)	cis-1,2-Dichloroethene	6.71	61	2622313	224.07	ug/L		90
33)	Ethyl Acetate	6.81	70	258530	240.26	ug/L	#	81
34)	Bromochloromethane	6.99	130	1014041	252.82	ug/L		87
35)	Chloroform (C)	6.96	83	3116662	236.95	ug/L		99
36)	2,2-Dichloropropane	6.82	77	2580742	226.75	ug/L	#	90
38)	tert-Butyl Ethyl Ether	6.83	59	6961553	227.51	ug/L		95
39)	Isobutyl Alcohol	7.06	43	68378	193.27	ug/L		93
40)	Tetrahydrofuran	7.17	72	493439	452.89	ug/L		88
42)	1,2-Dichloroethane	7.72	62	2354473	203.53	ug/L	#	82
43)	1,1,1-Trichloroethane	7.52	97	2418413	194.04	ug/L		97
44)	1,1-Dichloropropene	7.74	75	2653374	207.87	ug/L		97
45)	Cyclohexane	7.80	56	4433082	245.52	ug/L		91
46)	Isopropyl Acetate	7.80	43	4494951	210.52	ug/L	#	95
47)	Carbon Tetrachloride	7.86	117	2007654	190.89	ug/L		99
48)	Benzene	7.89	78	8736251	268.69	ug/L		96
49)	tert-Amyl Methyl Ether	8.07	43	1851251	186.19	ug/L	#	69
50)	Dibromomethane	8.81	93	1222396	209.35	ug/L		90
51)	1,2-Dichloropropane (C)	8.69	63	2295138	238.91	ug/L		96
52)	2-Nitropropane	8.95	43	1608803	201.78	ug/L	#	97
53)	Trichloroethene	8.64	130	1964170	214.71	ug/L		99
54)	Bromodichloromethane	8.87	83	2555807	235.29	ug/L		98
55)	1,4-Dioxane	8.85	88	20758	196.86	ug/L	#	19
57)	Methyl Methacrylate	8.81	69	1851138	217.50	ug/L	#	92
58)	n-Propyl Acetate	8.83	43	3177565	179.53	ug/L		100
59)	Methyl Cyclohexane	9.02	83	4503120	221.41	ug/L		100
60)	2-Chloroethyl Vinyl Ether	9.21	63	1451414	191.51	ug/L		95
61)	cis-1,3-Dichloropropene	9.44	75	3409939	202.80	ug/L		98
62)	4-Methyl-2-pentanone (MIBK	9.36	43	2031647	174.55	ug/L	#	93
63)	trans-1,3-Dichloropropene	9.91	75	3599790	221.12	ug/L	#	81
64)	1,1,2-Trichloroethane	10.06	83	1712353	216.85	ug/L		95
66)	Toluene (C)	9.91	92	6225083	253.54	ug/L		98
67)	1,3-Dichloropropane	10.27	76	3277026	200.15	ug/L		98
68)	Ethyl Methacrylate	10.09	69	3024916	203.44	ug/L	#	72
69)	2-Hexanone	10.20	43	1385545	175.43	ug/L		94
70)	Dibromochloromethane	10.54	129	1981224	229.31	ug/L		97
71)	1,2-Dibromoethane (EDB)	10.75	107	1704765	212.96	ug/L		99
72)	Tetrachloroethene	10.65	164	1582046	208.19	ug/L		94
73)	1,1,1,2-Tetrachloroethane	11.35	131	1805283	232.30	ug/L		98

331

(#) = qualifier out of range (m) = manual integration

Data File : I:\MS52\DATA\MS52-141128\1128-016.D Vial: 12
Acq On : 28 Nov 2014 9:08 pm Operator: JDB
Sample : ICAL7 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:02 2014 Quant Results File: 141118W.RES

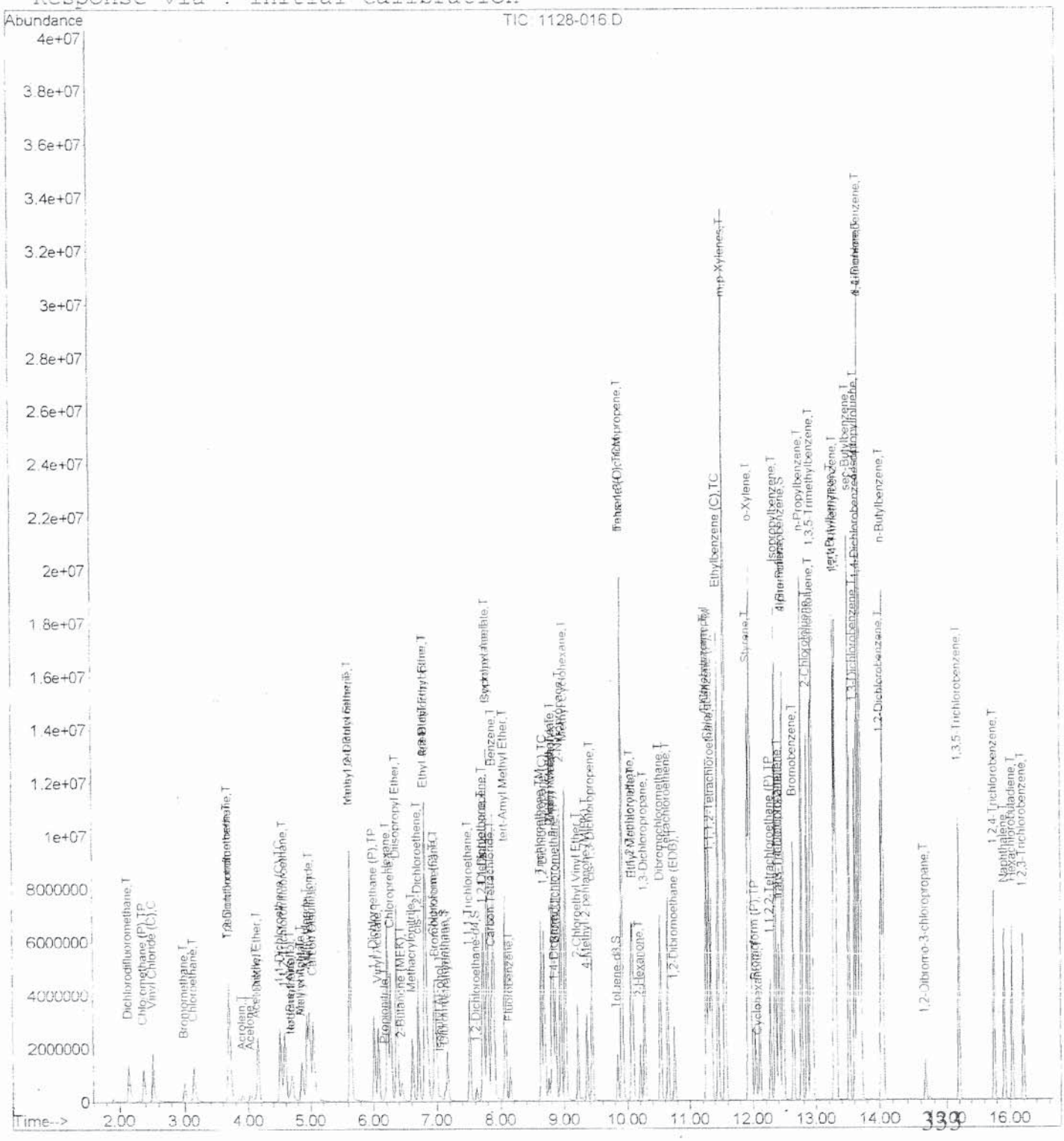
Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
74)	1-Chlorohexane	11.27	91	3574187	225.18	ug/L		85
75)	Chlorobenzene (P)	11.31	112	5947382	245.84	ug/L		92
76)	Ethylbenzene (C)	11.45	106	3519109	248.46	ug/L	#	92
77)	m,p-Xylenes	11.57	106	10428922	475.28	ug/L	#	70
78)	Bromoform (P)	12.04	173	1171333	230.06	ug/L		100
79)	Cyclohexanone	12.08	55	131893	358.69	ug/L	#	20
80)	Styrene	11.92	104	7475363	258.11	ug/L		94
81)	1,1,2,2-Tetrachloroethane	12.28	83	2285157	198.47	ug/L		100
82)	o-Xylene	11.96	106	4619236	224.37	ug/L	#	87
83)	1,2,3-Trichloropropane	12.40	110	624554	199.22	ug/L	#	56
85)	trans-1,4-Dichloro-2-buten	12.42	53	724276	144.02	ug/L	#	1
86)	Isopropylbenzene	12.35	120	3006546	212.69	ug/L		95
88)	alpha-Pinene	12.48	93	6085297	180.25	ug/L		95
89)	Bromobenzene	12.63	77	4223678	172.49	ug/L	#	80
90)	n-Propylbenzene	12.76	120	3180473	211.13	ug/L		67
91)	2-Chlorotoluene	12.85	126	2432273m	217.01	ug/L		
92)	4-Chlorotoluene	12.91	126	2739308	217.47	ug/L		94
93)	1,3,5-Trimethylbenzene	12.94	120	4970009	223.25	ug/L		93
94)	tert-Butylbenzene	13.28	91	5962858m	172.38	ug/L		
95)	1,2,4-Trimethylbenzene	13.32	120	5456180	217.29	ug/L	#	69
96)	sec-Butylbenzene	13.52	134	2542865	219.55	ug/L		82
97)	1,3-Dichlorobenzene	13.61	146	4881095	216.88	ug/L		96
98)	d-Limonene	13.71	68	3992787	159.39	ug/L	#	80
99)	1,4-Dichlorobenzene	13.71	146	6411698	264.09	ug/L		95
100)	4-Isopropyltoluene	13.66	134	3025636	226.70	ug/L		84
101)	1,2-Dichlorobenzene	14.03	146	4577984	214.36	ug/L		97
102)	n-Butylbenzene	14.06	92	5937840	206.10	ug/L		96
103)	1,2-Dibromo-3-chloropropan	14.67	157	373104	163.49	ug/L	#	82
104)	1,3,5-Trichlorobenzene	15.19	180	3074412	223.87	ug/L		98
105)	1,2,4-Trichlorobenzene	15.76	180	2281461	213.16	ug/L		96
106)	Naphthalene	15.92	128	4665623	201.30	ug/L		99
107)	Hexachlorobutadiene	16.04	225	1163546	207.93	ug/L		97
108)	1,2,3-Trichlorobenzene	16.20	180	1762310	192.84	ug/L		98

(#) = qualifier out of range (m) = manual integration
1128-016.D 141118W.M Sun Nov 30 13:02:47 2014

Data File : I:\MS52\DATA\MS52-141128\1128-016.D Vial: 12
Acq On : 28 Nov 2014 9:08 pm Operator: JDB
Sample : ICAL7 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:02 2014 Quant Results File: 141118W.RES

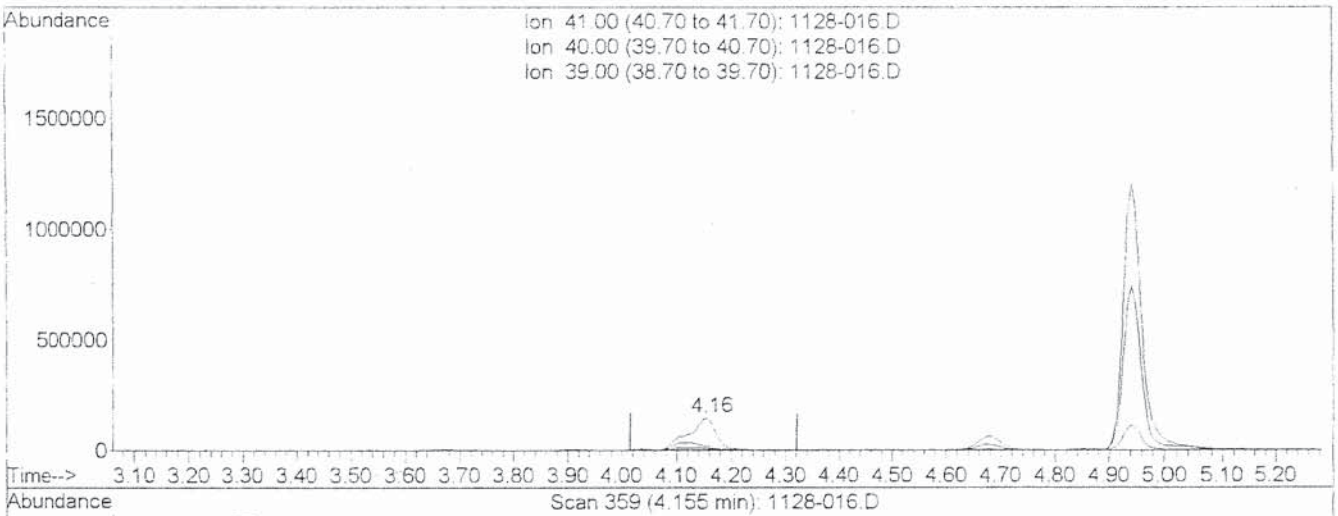
Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration

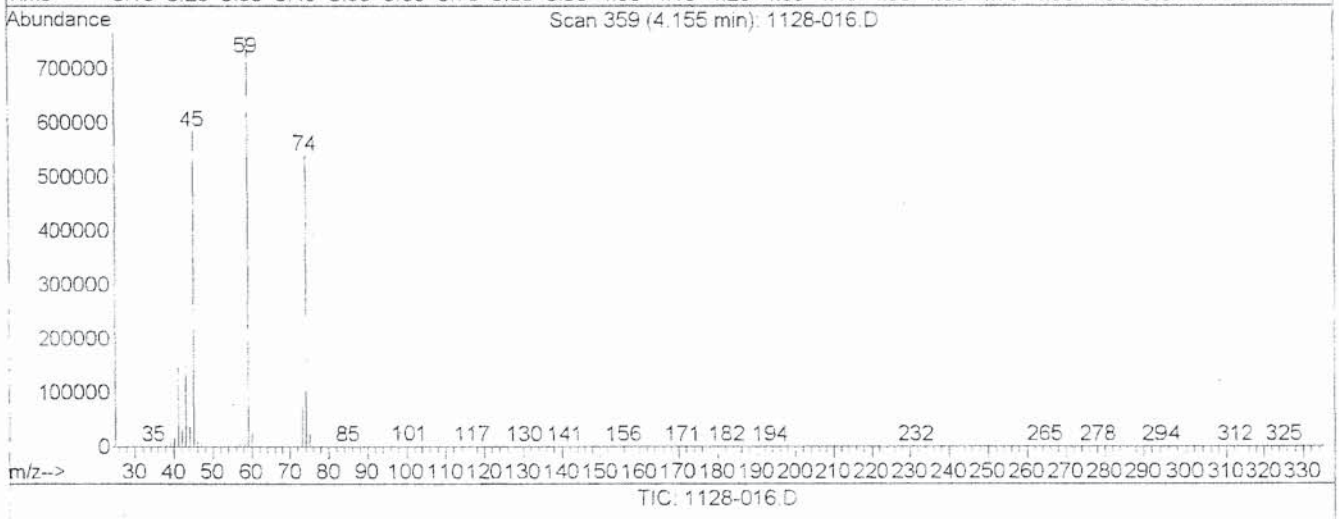


Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-016.D Vial: 12
Acq On : 28 Nov 2014 9:08 pm Operator: JDB
Sample : ICAL7 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 28 21:25 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-016.D

(9) Acetonitrile (T)

4.16min 593.61ug/L

response 517836

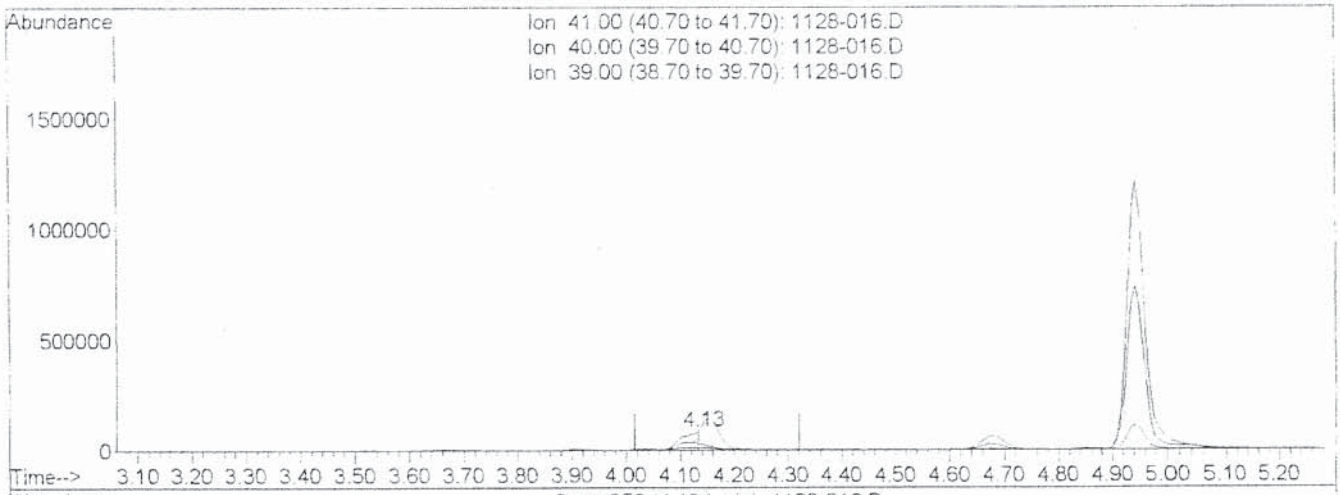
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	28.13#
39.00	15.40	11.51#
0.00	0.00	0.00

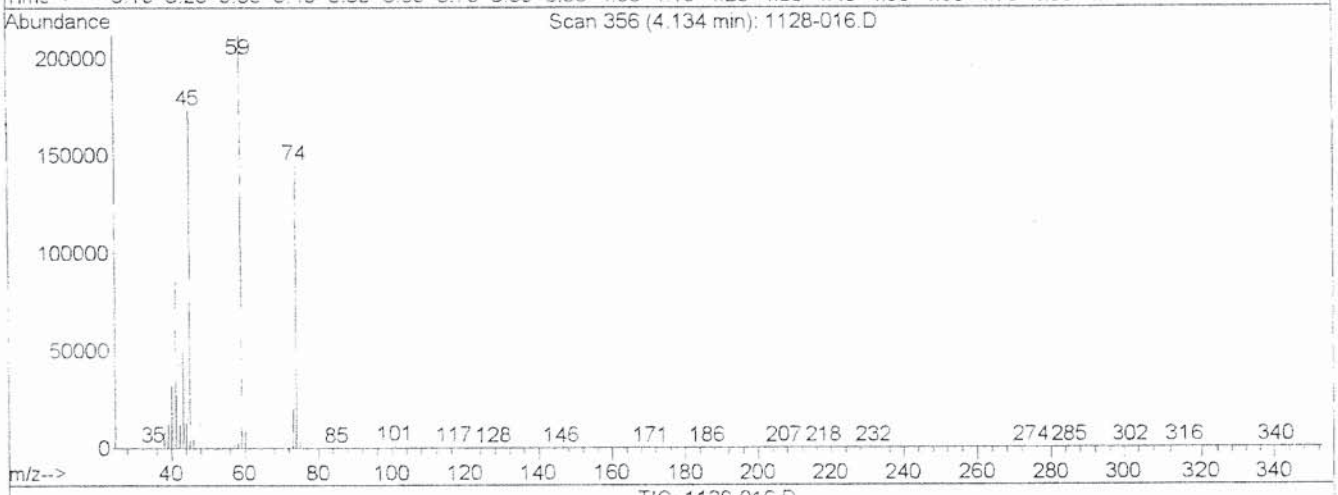
SMa

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-016.D Vial: 12
Acq On : 28 Nov 2014 9:08 pm Operator: JDB
Sample : ICAL7 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:01 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC 1128-016.D

(9) Acetonitrile (T)

4.13min 233.09ug/L m

response 204687

Ion	Exp%	Act%
41.00	100	100
40.00	49.00	71.17#
39.00	15.40	29.12#
0.00	0.00	0.00

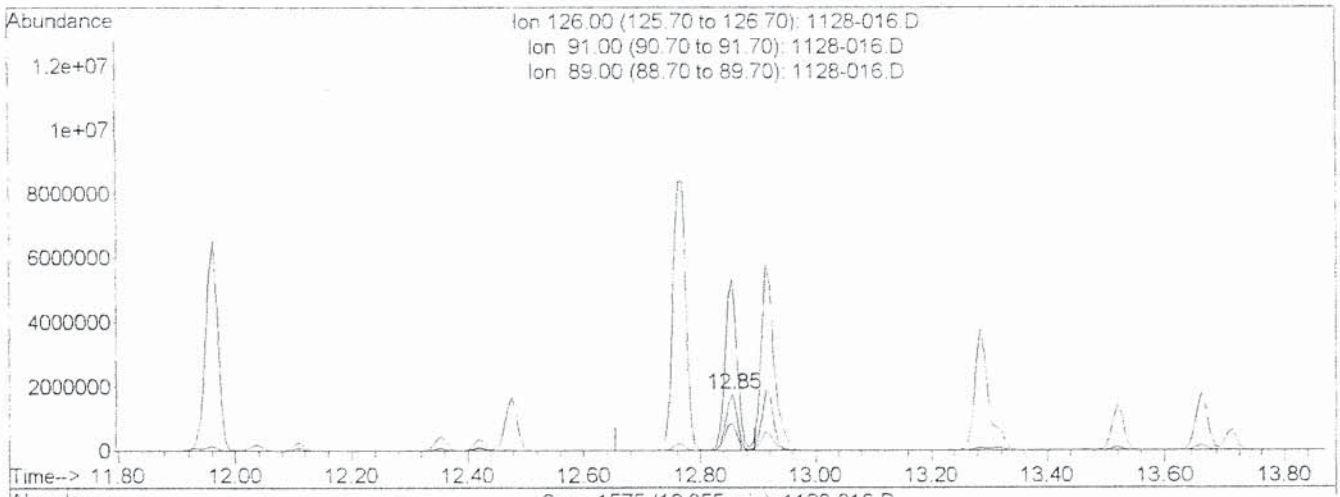
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 1/6/15

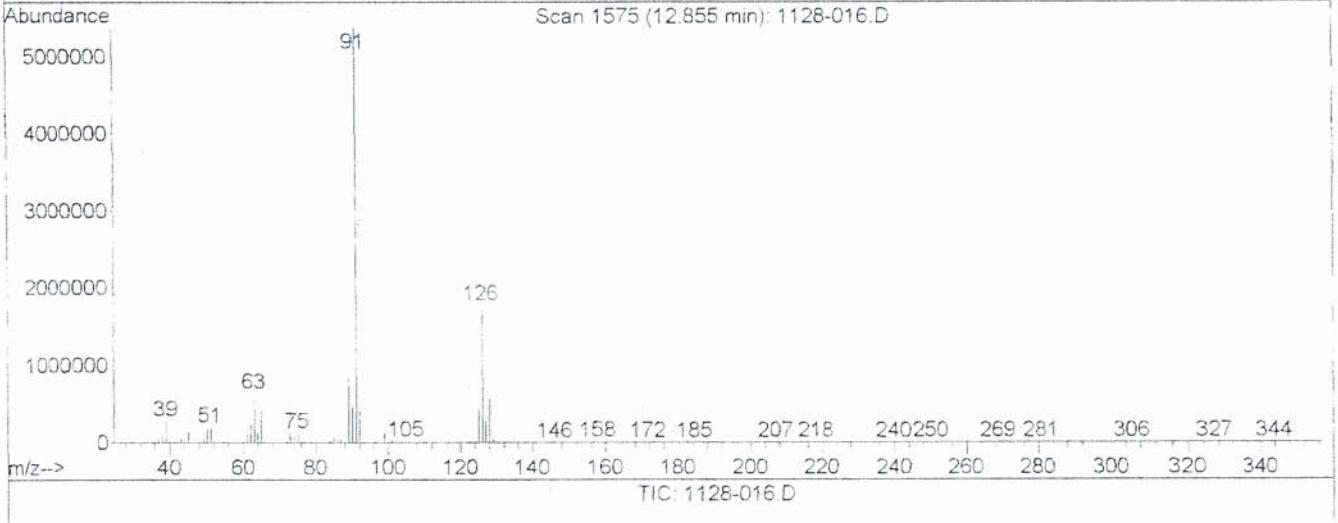
1128-016.D 141118W.M Sun Nov 30 13:01:31 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-016.D Vial: 12
Acq On : 28 Nov 2014 9:08 pm Operator: JDB
Sample : ICAL7 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:01 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-016.D

(91) 2-Chlorotoluene (T)

12.85min 212.26ug/L

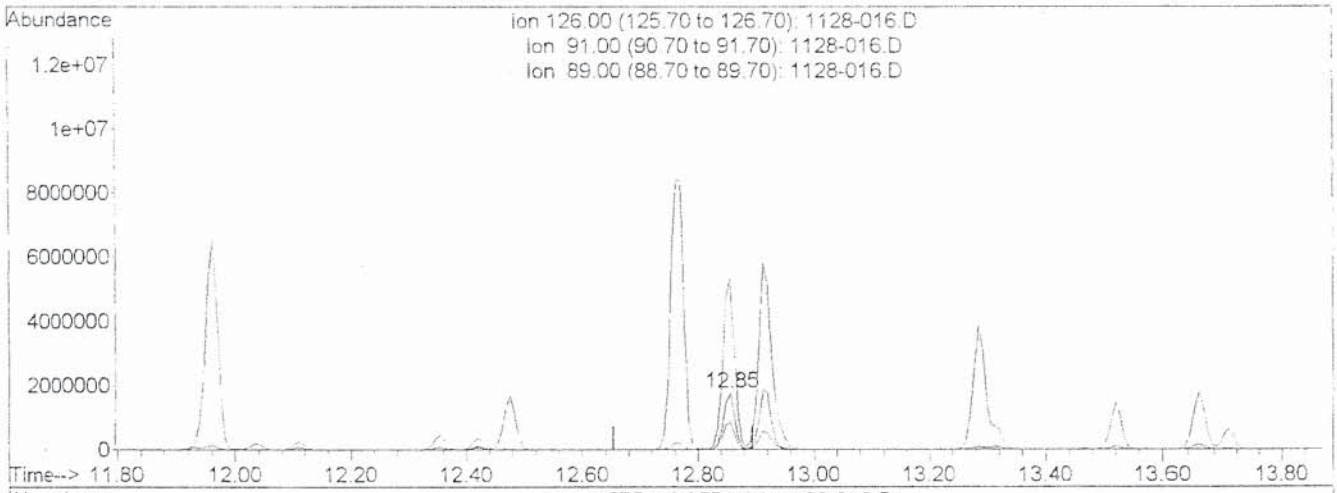
response 2379102

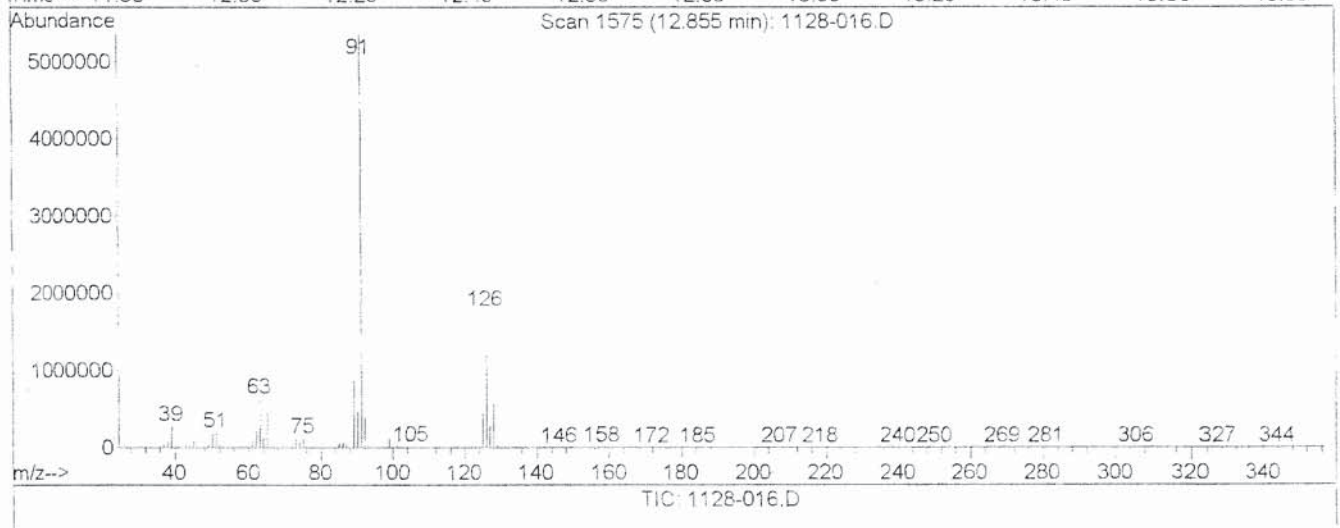
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	311.53
89.00	59.80	52.14
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-016.D Vial: 12
Acq On : 28 Nov 2014 9:08 pm Operator: JDB
Sample : ICAL7 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:02 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-016.D

(91) 2-Chlorotoluene (T)

12.85min 217.01ug/L m

response 2432273

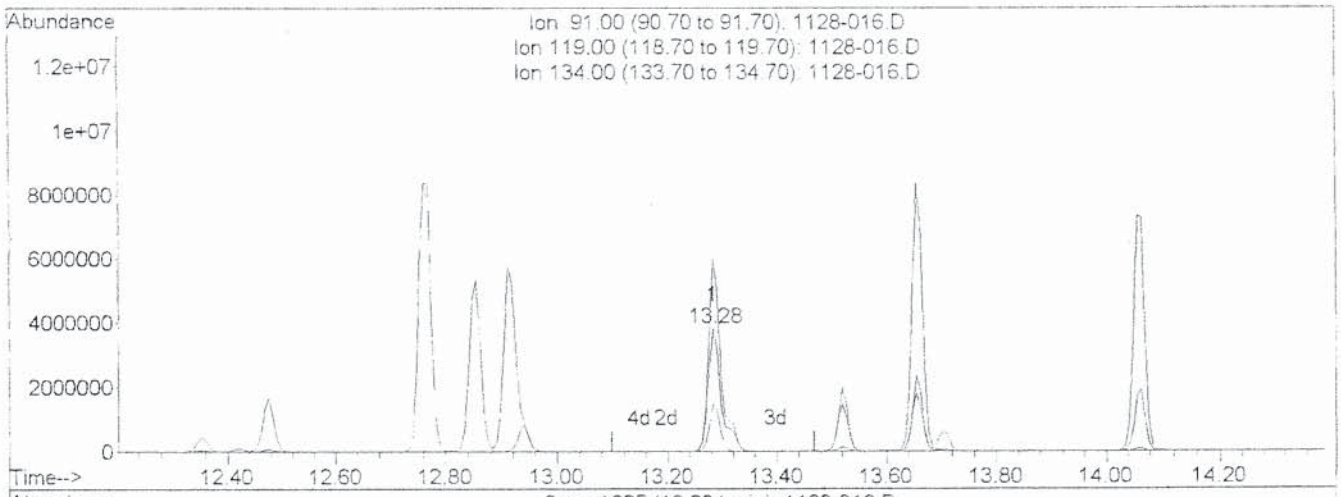
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	304.72
89.00	59.80	51.00
0.00	0.00	0.00

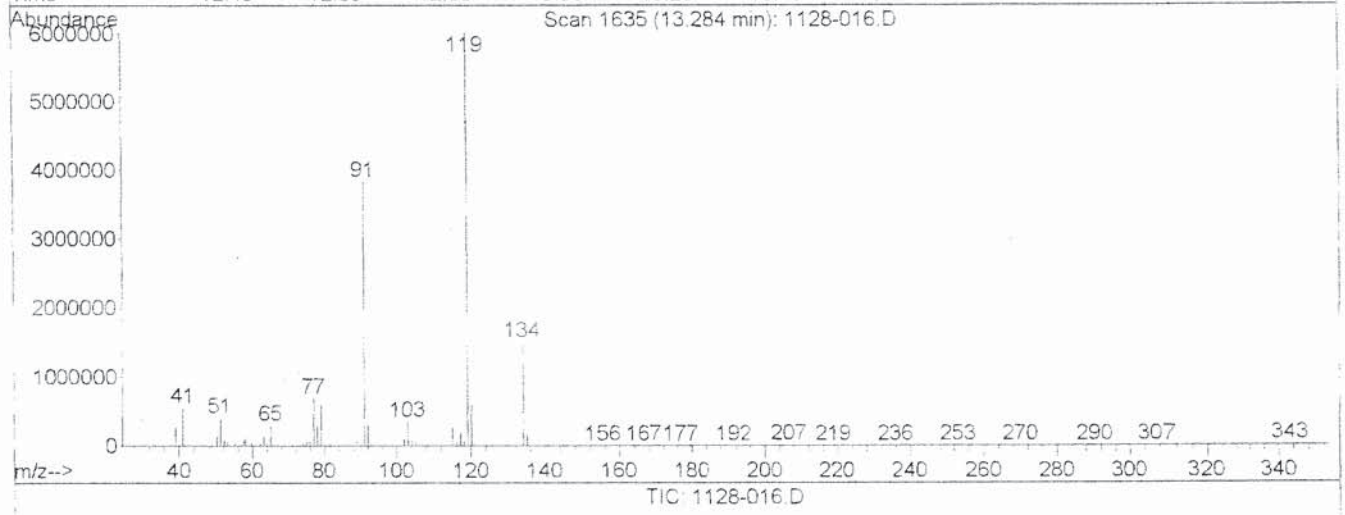
MANUAL EDIT CODES
1 WRONG PEAK SELECTED
2 POOR INTEGRATION
3 PEAK NOT FOUND
4 OTHER
ANALYST
DATE 11/30/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-016.D Vial: 12
Acq On : 28 Nov 2014 9:08 pm Operator: JDB
Sample : ICAL7 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:02 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-016.D

(94) tert-Butylbenzene (T)

13.28min 186.01ug/L

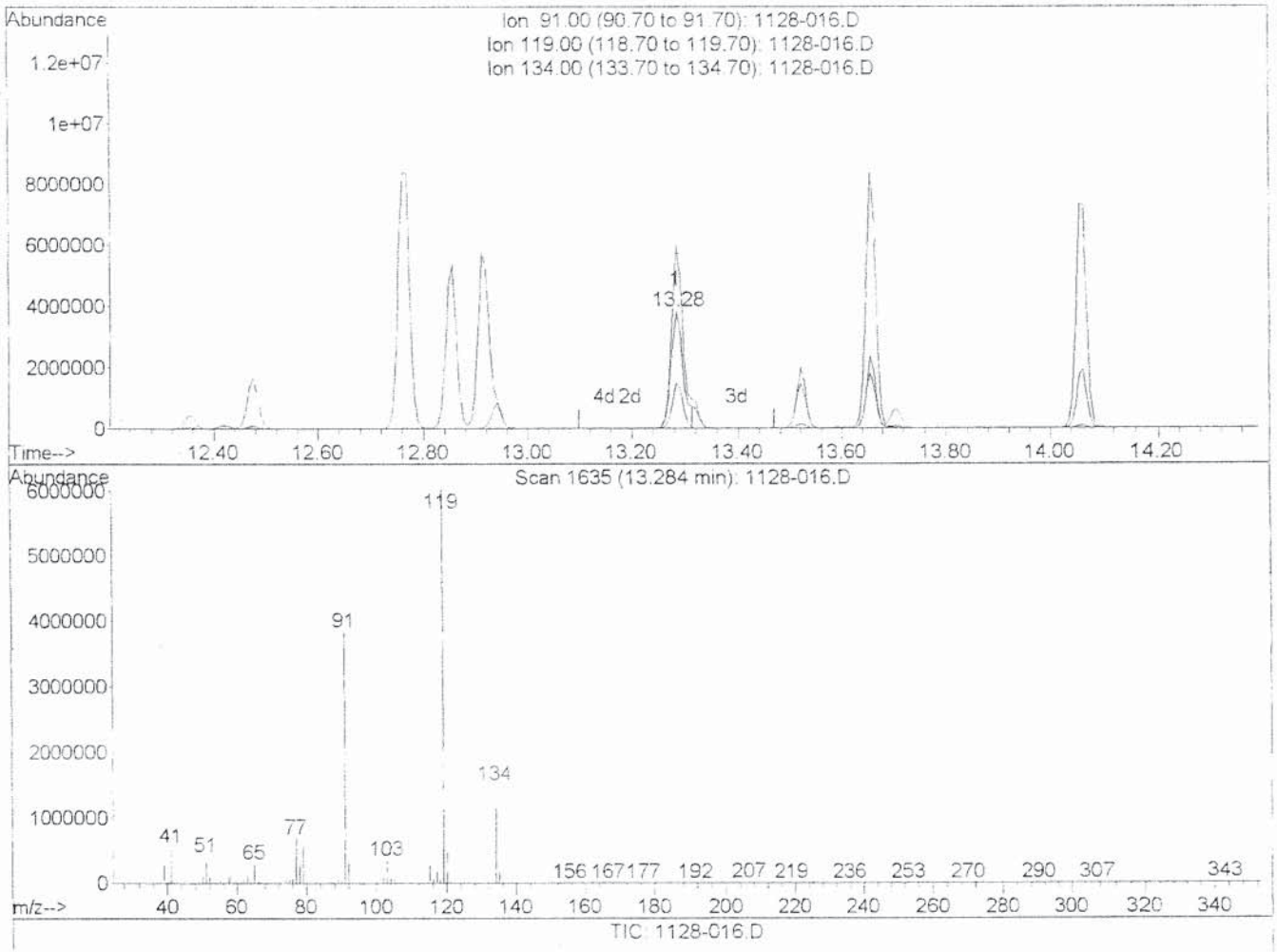
response 6434391

Ion	Exp%	Act%
91.00	100	100
119.00	136.80	149.85
134.00	31.60	32.55
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-016.D Vial: 12
Acq On : 28 Nov 2014 9:08 pm Operator: JDB
Sample : ICAL7 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:02 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration



TIC: 1128-016.D

(94) tert-Butylbenzene (T)

13.28min 172.38ug/L m

response 5962858

Ion	Exp%	Act%
91.00	100	100
119.00	136.80	161.70
134.00	31.60	35.13
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JJC
DATE 11/6/15

1128-016.D 141118W.M Sun Nov 30 13:02:32 2014

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:04 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Fluorobenzene	8.15	96	1103301	50.00	ug/L		0.00
56) Chlorobenzene-d5	11.27	82	743409	50.00	ug/L		0.00
84) 1,4-Dichlorobenzene-d4	13.68	152	740191	50.00	ug/L		0.00
System Monitoring Compounds							
37) Dibromofluoromethane	7.14	111	245217	50.60	ug/L		0.00
Spiked Amount 50.000	Range 86 - 112		Recovery = 101.20%				
41) 1,2-Dichloroethane-d4	7.62	65	301733	41.37	ug/L		0.00
Spiked Amount 50.000	Range 72 - 121		Recovery = 82.74%				
65) Toluene-d8	9.84	98	1193589	39.50	ug/L		0.00
Spiked Amount 50.000	Range 88 - 115		Recovery = 79.00%#				
87) 4-Bromofluorobenzene	12.47	95	827053	46.08	ug/L		0.01
Spiked Amount 50.000	Range 86 - 113		Recovery = 92.16%				
Target Compounds							Qvalue
2) Dichlorodifluoromethane	2.14	85	4861386	471.63	ug/L		99
3) Chloromethane (P)	2.37	50	6802493	539.25	ug/L		97
4) Vinyl Chloride (C)	2.51	62	4378495	422.84	ug/L		99
5) Bromomethane	2.97	96	2585278	524.52	ug/L		94
6) Chloroethane	3.12	64	3961233	565.39	ug/L	#	92
7) 1,2-Dichlorotrifluoroethan	3.70	67	6315787	608.99	ug/L		95
8) Acrolein	3.91	56	1364625	802.56	ug/L		96
9) Acetonitrile	4.15	41	550040m	598.11	ug/L		
10) Trichlorofluoromethane	3.68	101	6283803	573.59	ug/L		98
11) Acetone	4.06	43	1343531	431.47	ug/L		92
12) Diethyl Ether	4.16	59	4618006	558.98	ug/L		92
13) 1,1-Dichloroethene (C)	4.50	61	7173948	519.53	ug/L		93
14) tert-Butyl Alcohol	4.77	59	1833340m	2197.98	ug/L		
15) Iodomethane	4.70	142	3012311	481.75	ug/L		95
16) Acrylonitrile	4.88	53	2093648	480.85	ug/L		97
17) Methylene Chloride	4.98	84	5378713	659.51	ug/L		84
18) Methyl Acetate	4.86	43	4144844	473.25	ug/L		94
19) Allyl Chloride	4.93	41	6974799	447.27	ug/L	#	89
20) 1,1,2-Trichlorotrifluoroet	4.58	101	4258996	567.21	ug/L		95
21) Carbon Disulfide	5.03	76	15519909	660.31	ug/L		98
22) trans-1,2-Dichloroethene	5.64	61	7508352	607.10	ug/L	#	75
23) Methyl tert-Butyl Ether	5.64	73	15844367	609.82	ug/L	#	94
24) 1,1-Dichloroethane (P)	6.01	63	9485666	595.56	ug/L		99
25) Propionitrile	6.20	54	831726	457.69	ug/L	#	1
26) Vinyl Acetate	6.08	43	11157441	484.70	ug/L	#	96
27) Chloroprene	6.27	53	8395464	511.48	ug/L	#	83
28) Hexane	6.22	57	10448050	500.87	ug/L	#	96

(#) = qualifier out of range (m) = manual integration
1128-019.D 141118W.M Sun Nov 30 13:05:06 2014 Page 1

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:04 2014 Quant Results File: 141118W.RES

Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
29)	2-Butanone (MEK)	6.46	43	2458911	498.55	ug/L		94
30)	Diisopropyl Ether	6.38	45	17539409	498.28	ug/L	#	86
31)	Methacrylonitrile	6.63	67	2358781	592.34	ug/L	#	79
32)	cis-1,2-Dichloroethene	6.72	61	7265264	588.86	ug/L	#	82
33)	Ethyl Acetate	6.82	70	711280	627.00	ug/L	#	35
34)	Bromochloromethane	6.99	130	3193922	755.33	ug/L	#	70
35)	Chloroform (C)	6.97	83	9321720	672.25	ug/L		98
36)	2,2-Dichloropropane	6.82	77	7262566	605.28	ug/L	#	91
38)	tert-Butyl Ethyl Ether	6.84	59	16822464	521.50	ug/L	#	83
39)	Isobutyl Alcohol	7.10	43	134715	357.09	ug/L	#	97
40)	Tetrahydrofuran	7.17	72	1296650	1128.86	ug/L		84
42)	1,2-Dichloroethane	7.72	62	6359413	521.44	ug/L	#	87
43)	1,1,1-Trichloroethane	7.52	97	7222646	539.16	ug/L		94
44)	1,1-Dichloropropene	7.74	75	7752781	566.74	ug/L	#	91
45)	Cyclohexane	7.80	56	10480666	550.59	ug/L	#	75
46)	Isopropyl Acetate	7.81	43	9226953	409.92	ug/L	#	85
47)	Carbon Tetrachloride	7.86	117	6243683	549.05	ug/L		99
48)	Benzene	7.89	78	19459288	567.69	ug/L	#	91
49)	tert-Amyl Methyl Ether	8.07	43	4289298	409.21	ug/L	#	32
50)	Dibromomethane	8.80	93	3691556	583.74	ug/L	#	79
51)	1,2-Dichloropropane (C)	8.70	63	6590852	650.77	ug/L		96
52)	2-Nitropropane	8.95	43	3290827	391.51	ug/L	#	94
53)	Trichloroethene	8.65	130	6823550	685.06	ug/L		97
54)	Bromodichloromethane	8.87	83	7657615	668.70	ug/L		98
55)	1,4-Dioxane	8.86	88	58501	526.24	ug/L	#	1
57)	Methyl Methacrylate	8.82	69	4931715	497.54	ug/L	#	72
58)	n-Propyl Acetate	8.84	43	7176459	348.16	ug/L	#	89
59)	Methyl Cyclohexane	9.03	83	13174195	556.18	ug/L		86
60)	2-Chloroethyl Vinyl Ether	9.22	63	4013762	454.75	ug/L		97
61)	cis-1,3-Dichloropropene	9.44	75	10082999	514.90	ug/L	#	91
62)	4-Methyl-2-pentanone (MIBK	9.36	43	5152340	380.08	ug/L	#	89
63)	trans-1,3-Dichloropropene	9.91	75	8920130	470.48	ug/L	#	69
64)	1,1,2-Trichloroethane	10.06	83	5210288	566.54	ug/L		93
66)	Toluene (C)	9.92	92	15904513	556.20	ug/L	#	69
67)	1,3-Dichloropropane	10.28	76	9649665	506.06	ug/L		98
68)	Ethyl Methacrylate	10.09	69	8511696	491.53	ug/L	#	56
69)	2-Hexanone	10.21	43	3465431	376.74	ug/L		91
70)	Dibromochloromethane	10.54	129	6661822	662.05	ug/L		97
71)	1,2-Dibromoethane (EDB)	10.76	107	5378487	576.91	ug/L		98
72)	Tetrachloroethene	10.65	164	6051807	666.58	ug/L		87
73)	1,1,1,2-Tetrachloroethane	11.35	131	6165214	680.89	ug/L		98

(#) = qualifier out of range (m) = manual integration

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:04 2014 Quant Results File: 141118W.RES

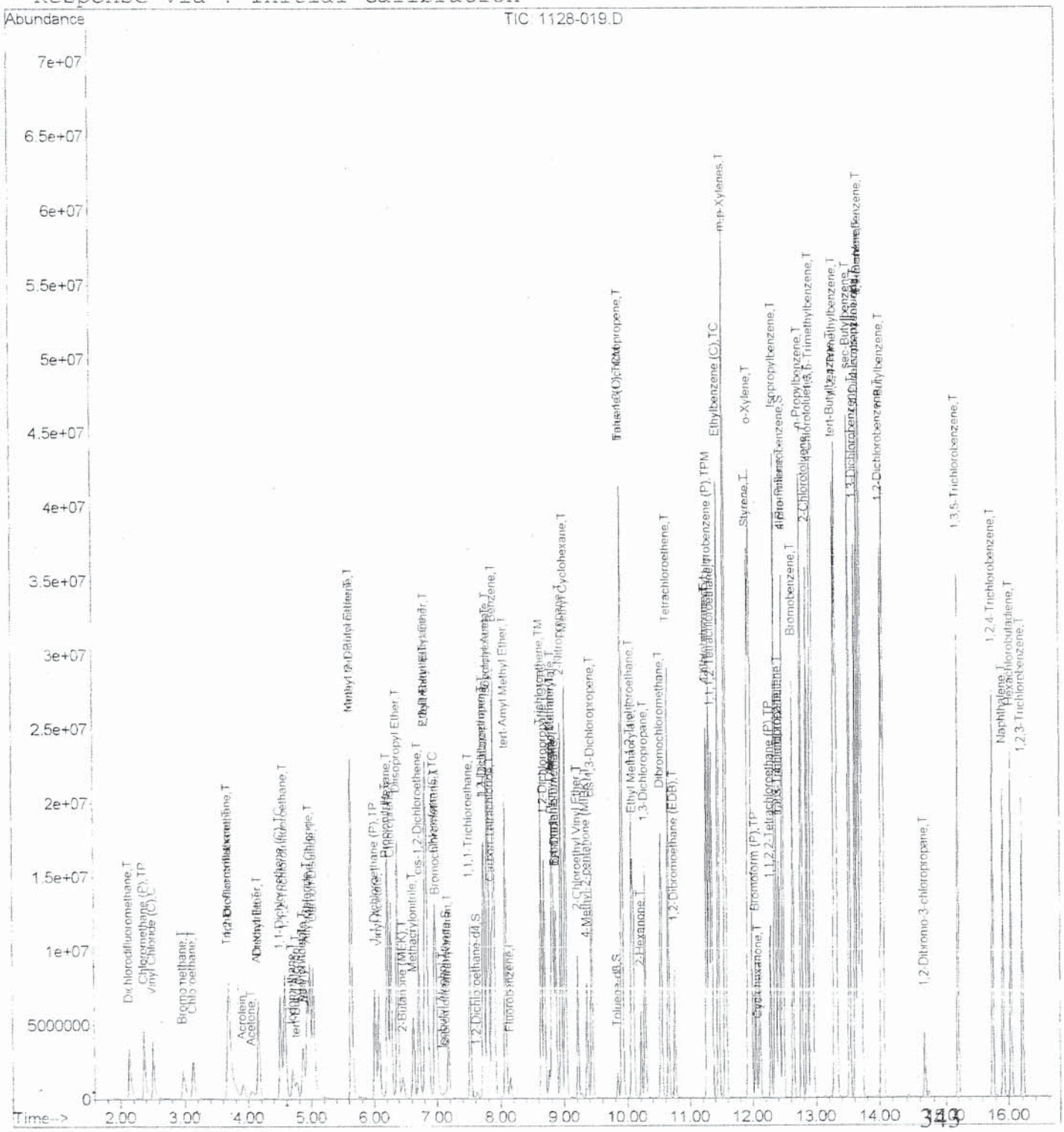
Quant Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
74) 1-Chlorohexane	11.27	91	10432174	564.34	ug/L	#	70
75) Chlorobenzene (P)	11.31	112	16296232	578.40	ug/L	#	90
76) Ethylbenzene (C)	11.46	106	11028461	668.58	ug/L	#	25
77) m,p-Xylenes	11.56	106	19384657	754.59	ug/L	#	1
78) Bromoform (P)	12.05	173	3919732	661.05	ug/L		98
79) Cyclohexanone	12.09	55	338638	822.75	ug/L	#	21
80) Styrene	11.92	104	18966478	562.30	ug/L	#	84
81) 1,1,2,2-Tetrachloroethane	12.28	83	6363172	474.54	ug/L		99
82) o-Xylene	11.97	106	13339955	549.34	ug/L	#	52
83) 1,2,3-Trichloropropane	12.41	110	1893536	518.63	ug/L	#	68
85) trans-1,4-Dichloro-2-buten	12.42	53	1783070	270.07	ug/L	#	1
86) Isopropylbenzene	12.36	120	9688951	522.10	ug/L	#	25
88) alpha-Pinene	12.47	93	15034002	339.21	ug/L	#	93
89) Bromobenzene	12.64	77	11782734	366.54	ug/L	#	52
90) n-Propylbenzene	12.77	120	10072259	509.30	ug/L	#	1
91) 2-Chlorotoluene	12.86	126	8005009m	544.02	ug/L		
92) 4-Chlorotoluene	12.92	126	8668934	524.22	ug/L	#	43
93) 1,3,5-Trimethylbenzene	12.95	120	14139456	483.79	ug/L	#	53
94) tert-Butylbenzene	13.29	91	15824606m	348.46	ug/L		
95) 1,2,4-Trimethylbenzene	13.32	120	15943079	483.63	ug/L	#	31
96) sec-Butylbenzene	13.53	134	8133470	534.91	ug/L	#	1
97) 1,3-Dichlorobenzene	13.62	146	14483689	490.19	ug/L	#	89
98) d-Limonene	13.71	68	6892694	209.59	ug/L	#	64
99) 1,4-Dichlorobenzene	13.71	146	14758806	463.04	ug/L	#	92
100) 4-Isopropyltoluene	13.66	134	8827766	503.82	ug/L	#	28
101) 1,2-Dichlorobenzene	14.03	146	14711039	524.70	ug/L		91
102) n-Butylbenzene	14.06	92	14387545	380.39	ug/L	#	62
103) 1,2-Dibromo-3-chloropropan	14.67	157	1108489	369.99	ug/L	#	79
104) 1,3,5-Trichlorobenzene	15.20	180	10926286	606.04	ug/L		96
105) 1,2,4-Trichlorobenzene	15.76	180	8193103	583.08	ug/L		97
106) Naphthalene	15.92	128	13615378	447.47	ug/L		99
107) Hexachlorobutadiene	16.04	225	4071435	554.20	ug/L		97
108) 1,2,3-Trichlorobenzene	16.20	180	5821578	482.53	ug/L		97

(#) = qualifier out of range (m) = manual integration
1128-019.D 141118W.M Sun Nov 30 13:05:06 2014 Page 3

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: NORMAL.P
Quant Time: Nov 30 13:04 2014 Quant Results File: 141118W.RES

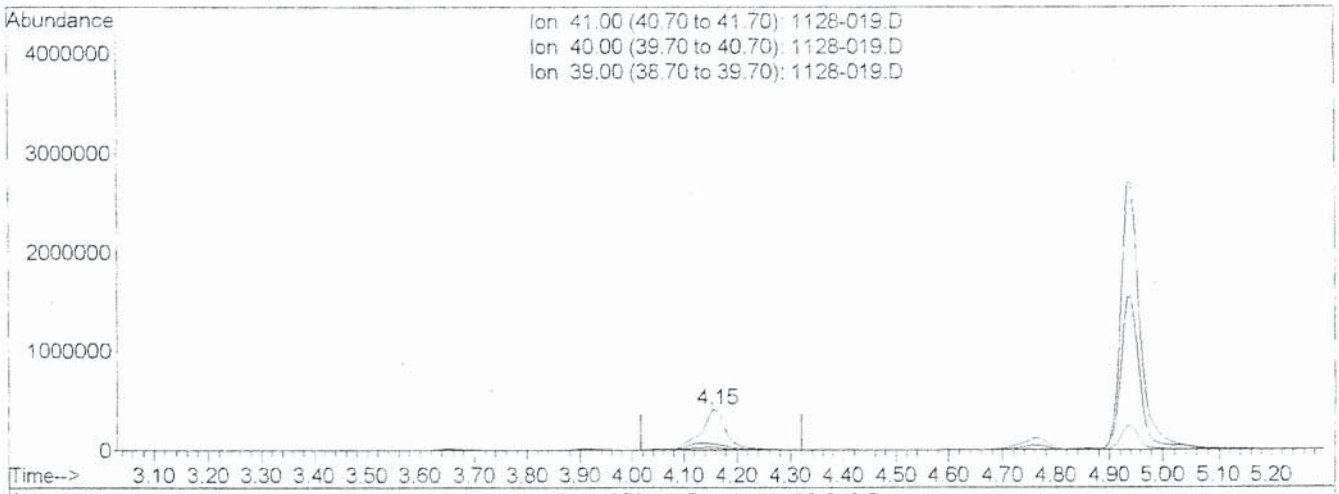
Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Initial Calibration

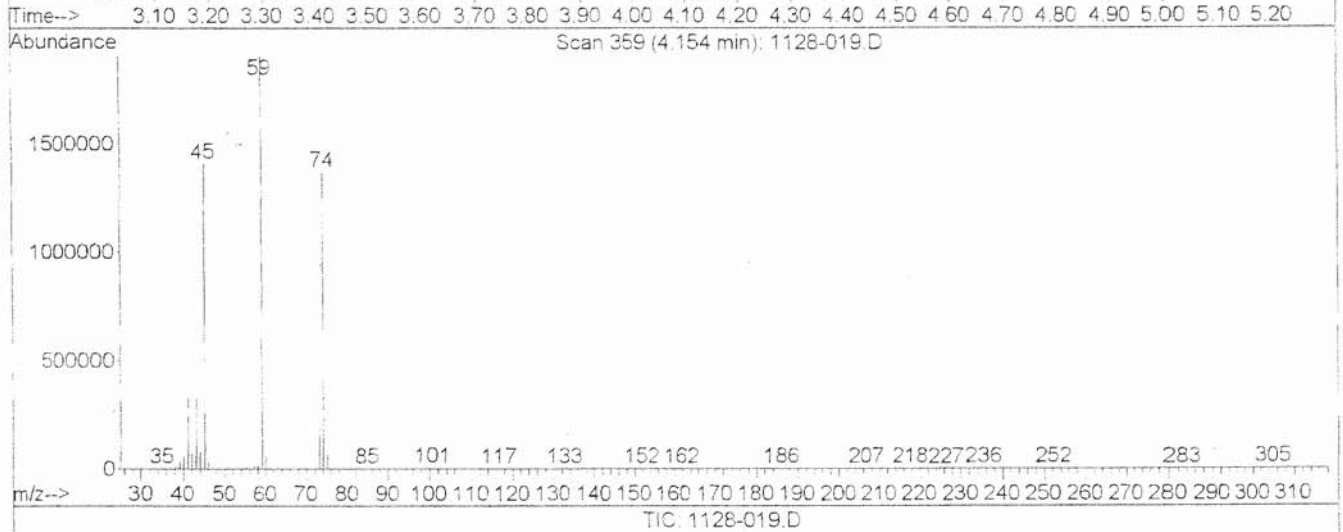


Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 28 22:45 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-019.D

(9) Acetonitrile (T)

4.15min 1505.65ug/L

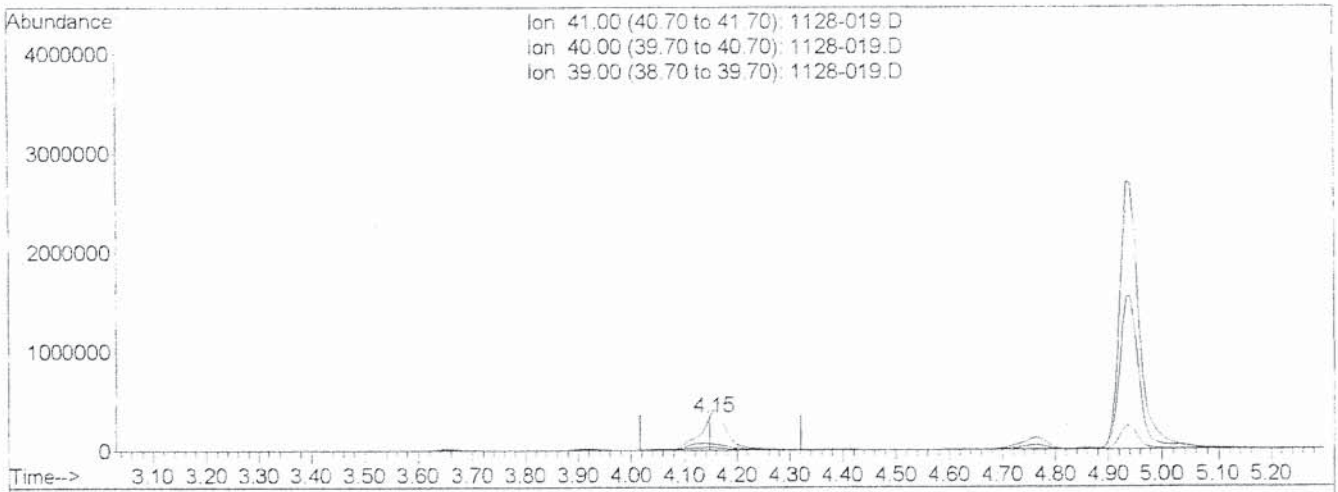
response 1381089

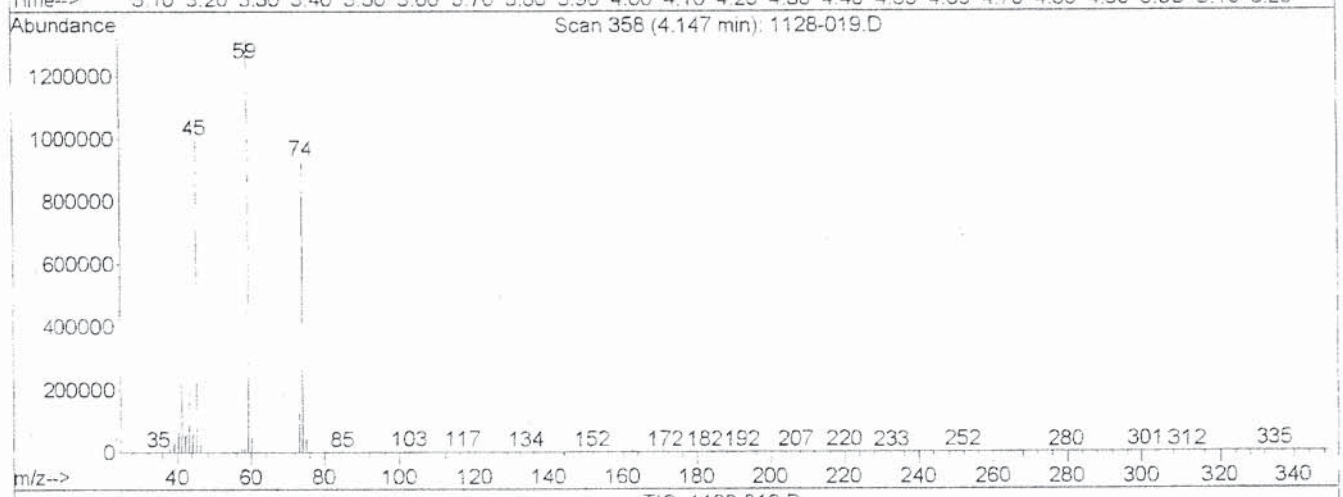
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	27.20#
39.00	15.40	11.29#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:03 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-019.D

(9) Acetonitrile (T)

4.15min 598.11ug/L m

response 550040

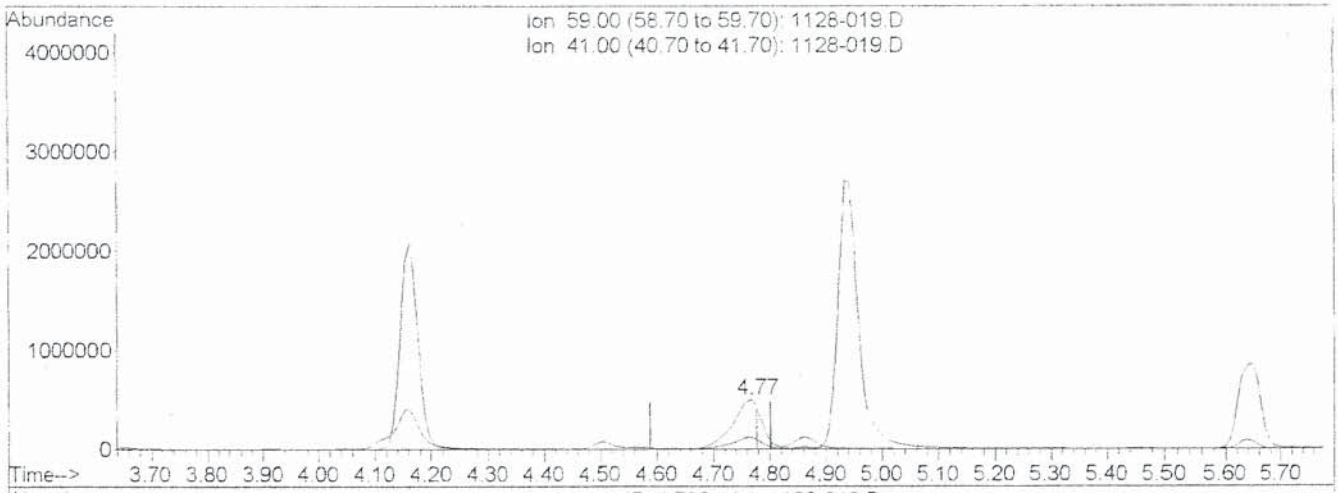
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	68.31#
39.00	15.40	28.36#
0.00	0.00	0.00

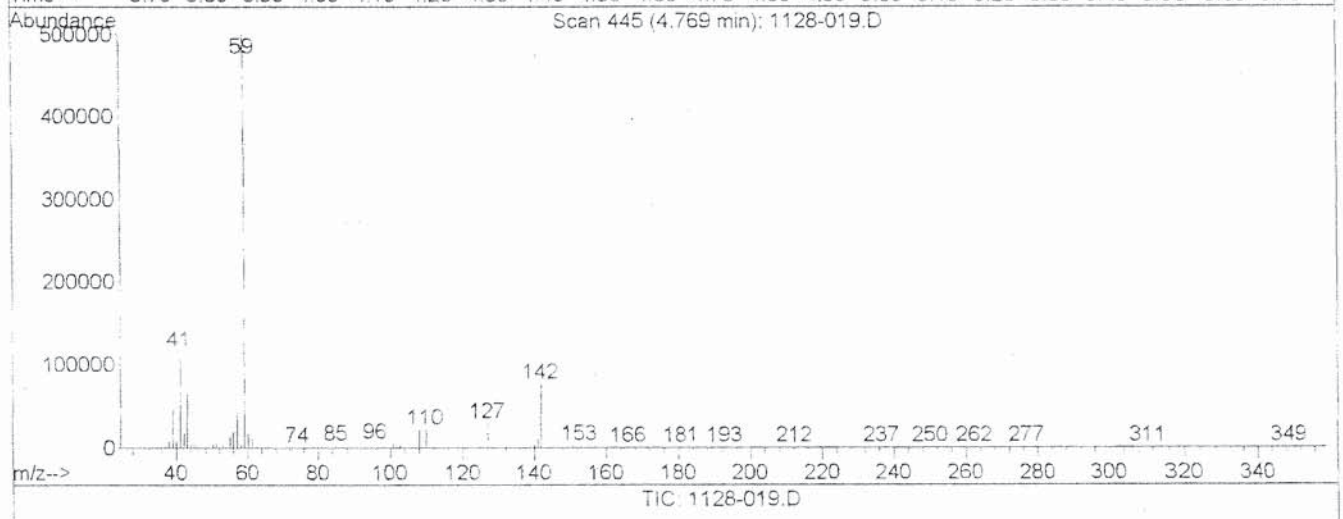
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DJK
DATE 12/01/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:03 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-019.D

(14) tert-Butyl Alcohol (T)

4.77min 1816.46ug/L

response 1515114

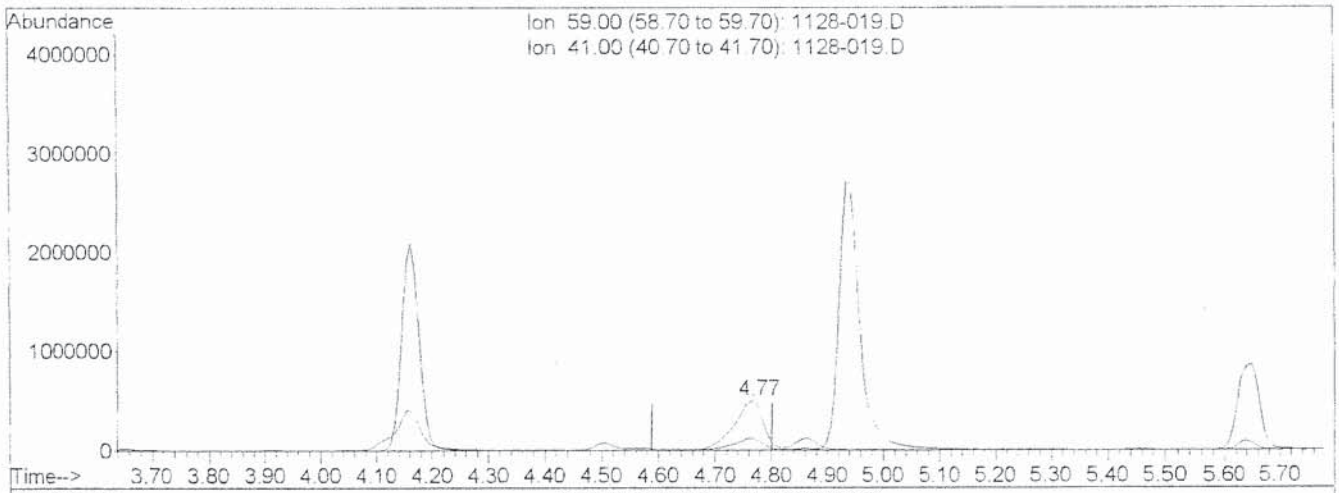
Ion	Exp%	Act%
59.00	100	100
41.00	23.90	23.50
0.00	0.00	0.00
0.00	0.00	0.00

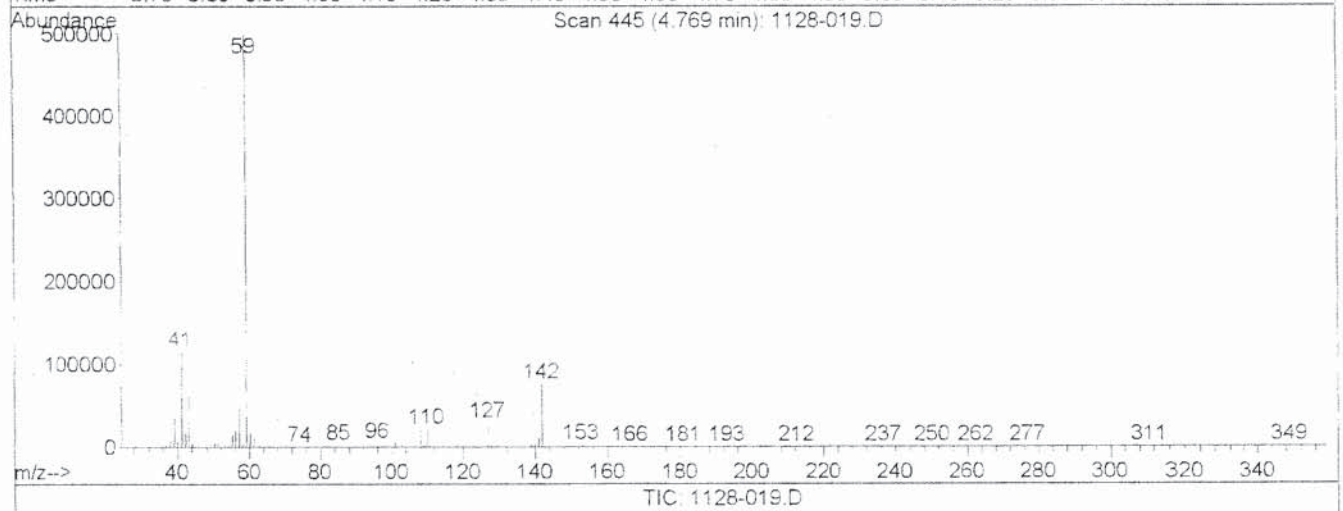
DJa

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:03 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-019.D

(14) tert-Butyl Alcohol (T)

4.77min 2197.98ug/L m

response 1833340

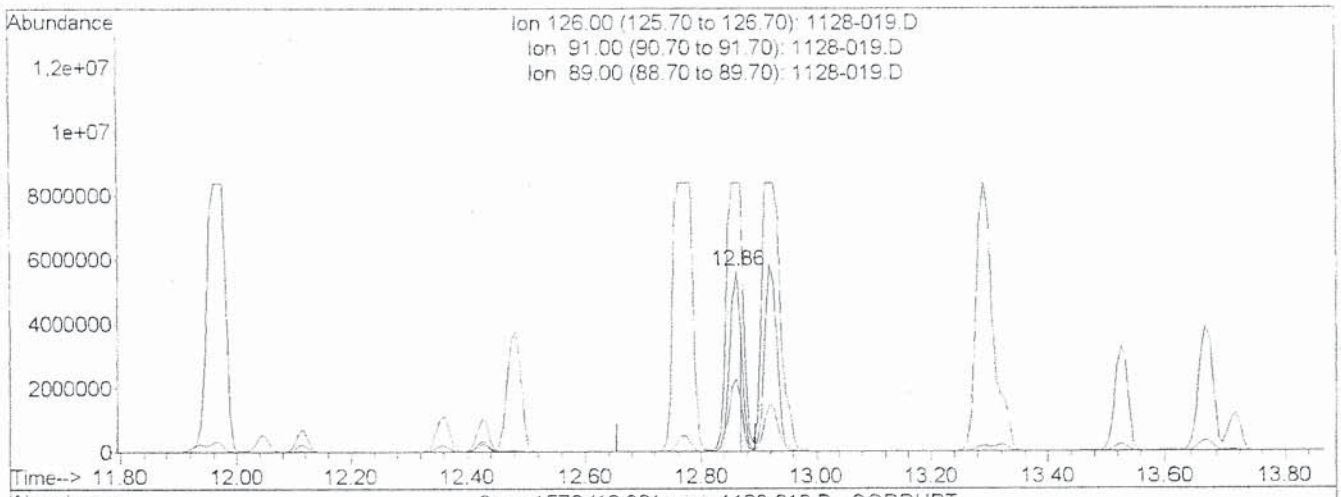
Ion	Exp%	Act%
59.00	100	100
41.00	23.90	19.42
0.00	0.00	0.00
0.00	0.00	0.00

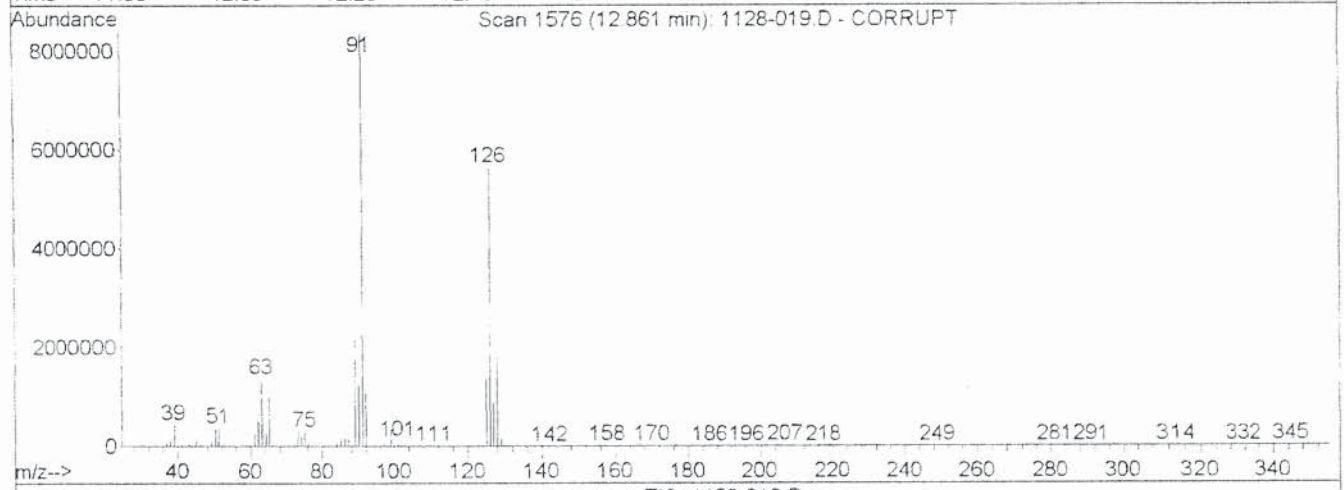
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 1/10/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:03 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-019.D

(91) 2-Chlorotoluene (T)

12.86min 498.57ug/L

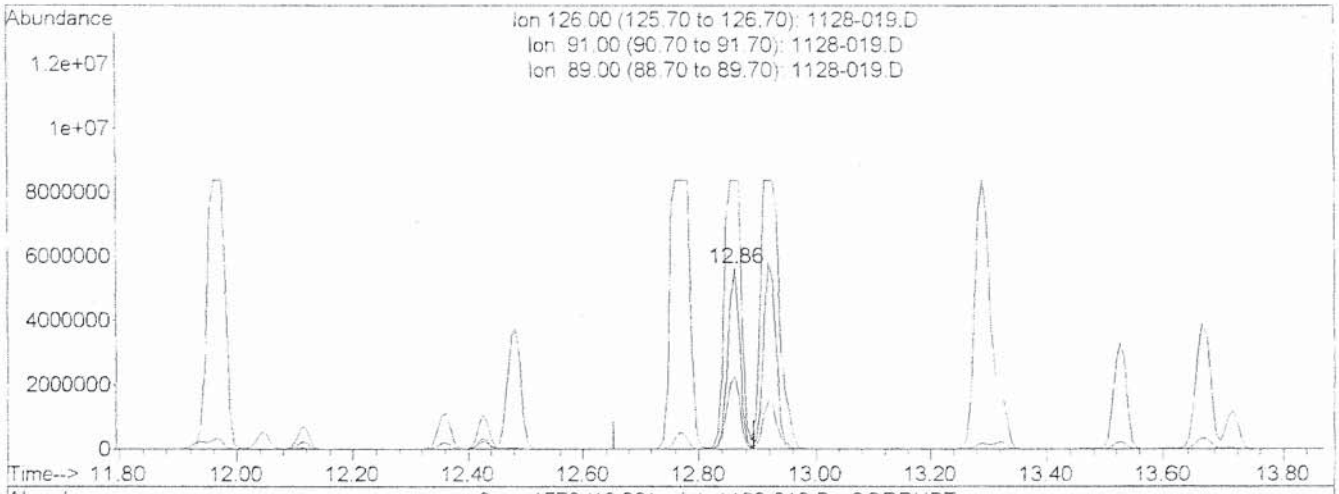
response 7336278

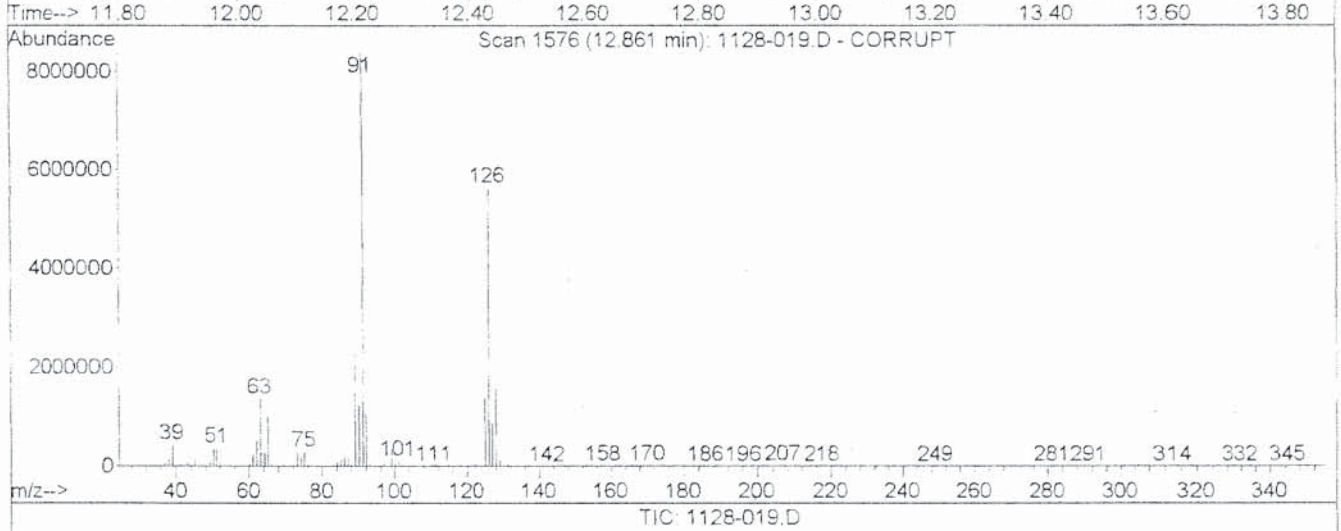
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	58.72#
89.00	59.80	44.61#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:04 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-019.D

(91) 2-Chlorotoluene (T)

12.86min 544.02ug/L m

response 8005009

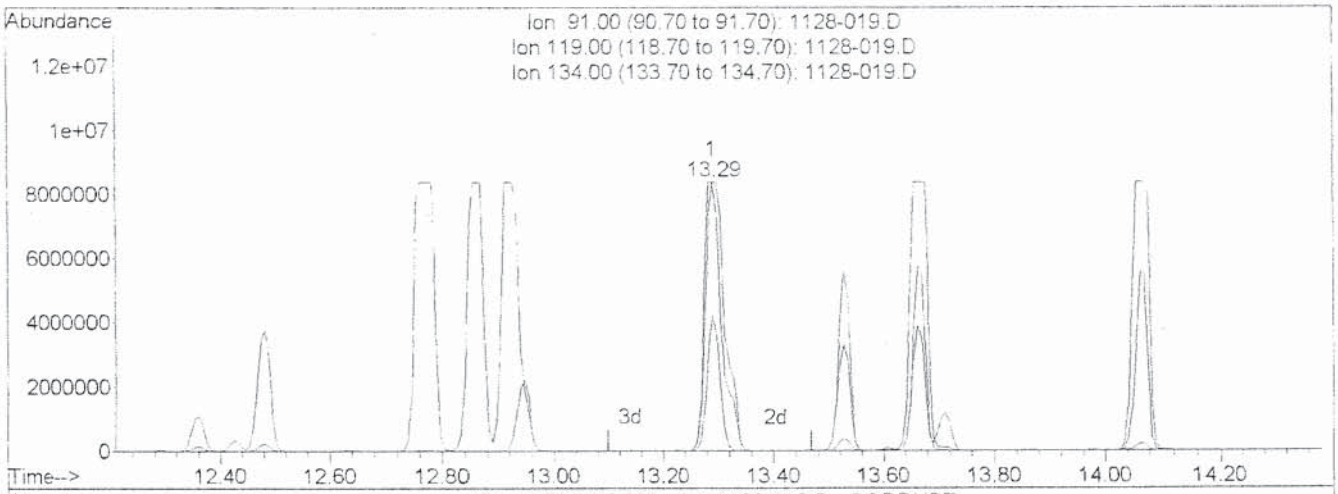
Ion	Exp%	Act%
126.00	100	100
91.00	355.90	53.81#
89.00	59.80	40.88#
0.00	0.00	0.00

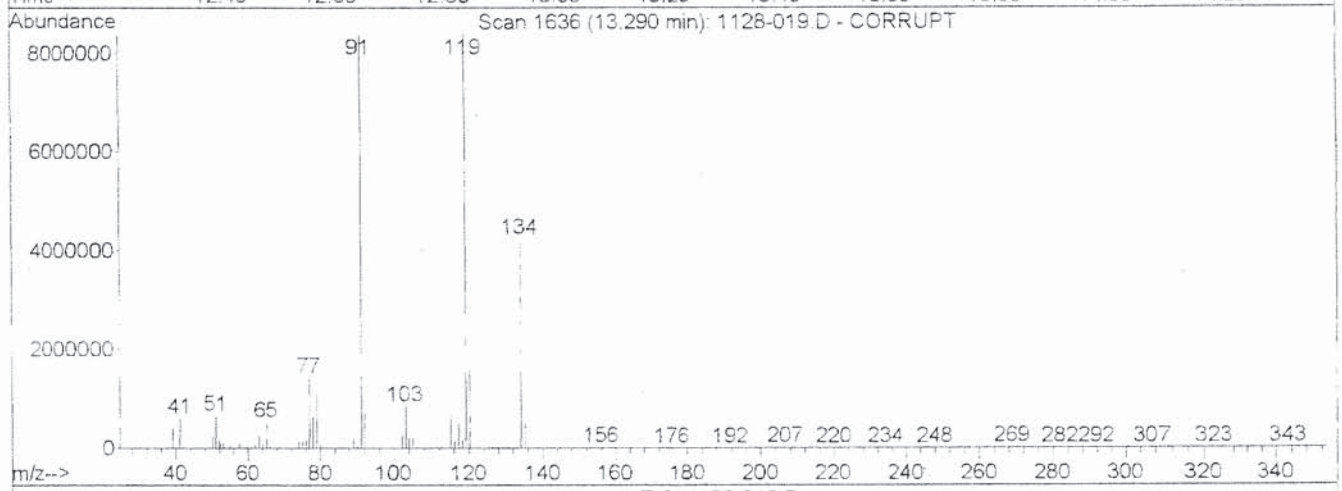
MANUAL EVALUATION
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 11/6/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:04 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-019.D

(94) tert-Butylbenzene (T)

13.29min 375.49ug/L

response 17051699

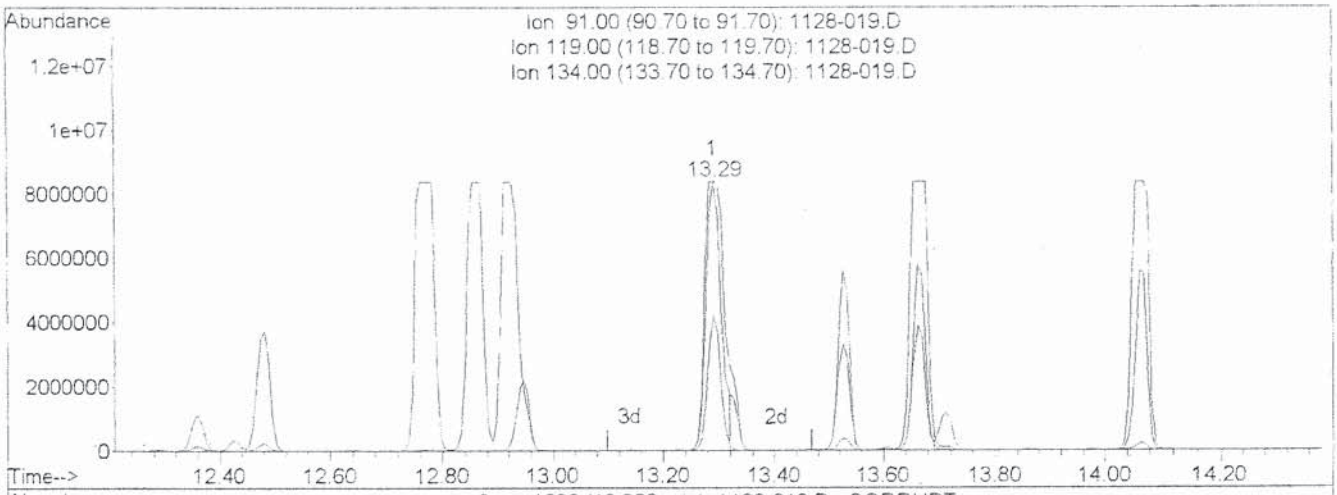
Ion	Exp%	Act%
91.00	100	100
119.00	136.80	127.97
134.00	31.60	39.69#
0.00	0.00	0.00

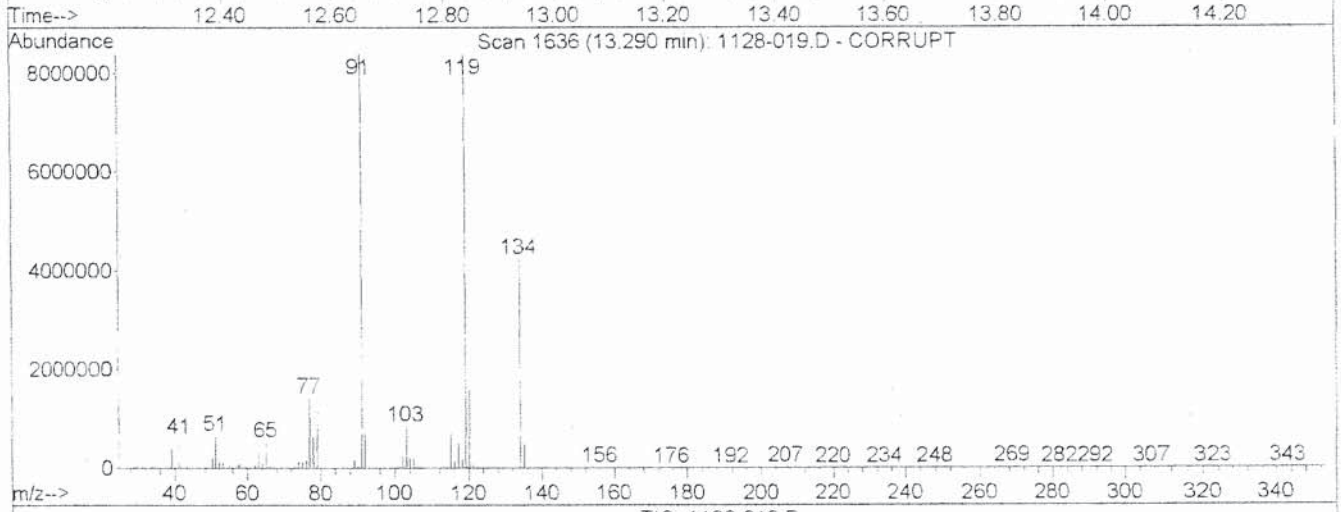
SJSa

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-019.D Vial: 15
Acq On : 28 Nov 2014 10:29 pm Operator: JDB
Sample : ICAL8 Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:04 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141118W.M (RTE Integrator)
Title : 8260
Last Update : Tue Nov 25 15:13:27 2014
Response via : Multiple Level Calibration





TIC: 1128-019.D

(94) tert-Butylbenzene (T)

13.29min 348.46ug/L m

response 15824606

Ion	Exp%	Act%
91.00	100	100
119.00	136.80	137.89
134.00	31.60	42.77#
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DDU
DATE 11/6/15

1128-019.D 141118W.M Sun Nov 30 13:04:41 2014

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
ICAL Date: 11/28/2014
Date Analyzed: 11/29/2014

Second Source Calibration Verification
Volatile Organic Compounds by GC/MS

ICAL Type: Internal Standard
Analysis Method: 8260B

ICAL ID: CAL3292
Units: ug/L

File ID: I:\MS52\DATA\MS52-141128\1128-023.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
1,1,1,2-Tetrachloroethane	100	110	0.663	0.697	5	NA	± 30 %	AverageRF
1,1,1-Trichloroethane (TCA)	100	91	0.508	0.545	NA	-9	± 30 %	Linear
† 1,1,2,2-Tetrachloroethane	100	93	0.939	0.875	-7	NA	± 30 %	AverageRF
1,1,2-Trichloroethane	100	98	0.675	0.664	-2	NA	± 30 %	AverageRF
† 1,1-Dichloroethane	100	100	0.770	0.788	2	NA	± 30 %	AverageRF
‡ 1,1-Dichloroethene	100	100	0.591	0.601	2	NA	± 30 %	AverageRF
1,2,3-Trichlorobenzene	100	100	0.723	0.758	5	NA	± 30 %	AverageRF
1,2,4-Trichlorobenzene	100	110	0.908	0.971	7	NA	± 30 %	AverageRF
1,2-Dibromo-3-chloropropane (DBCP	100	97	0.182	0.177	-3	NA	± 30 %	AverageRF
1,2-Dibromoethane (EDB)	100	100	0.678	0.680	0	NA	± 30 %	AverageRF
1,2-Dichlorobenzene	100	110	1.89	1.99	5	NA	± 30 %	AverageRF
1,2-Dichloroethane (EDC)	100	95	0.542	0.517	-5	NA	± 30 %	AverageRF
‡ 1,2-Dichloropropane	100	99	0.511	0.506	-1	NA	± 30 %	AverageRF
1,3-Dichlorobenzene	100	110	1.99	2.16	8	NA	± 30 %	AverageRF
1,4-Dichlorobenzene	100	95	2.26	2.57	NA	-5	± 30 %	Linear
2-Butanone (MEK)	100	94	0.208	0.196	-6	NA	± 30 %	AverageRF
2-Hexanone	100	96	0.546	0.524	-4	NA	± 30 %	AverageRF
4-Methyl-2-pentanone (MIBK)	100	96	0.818	0.785	-4	NA	± 30 %	AverageRF
Acetone	100	89	0.133	0.118	-11	NA	± 30 %	AverageRF
Benzene	100	110	1.76	1.90	8	NA	± 30 %	AverageRF
Bromochloromethane	100	98	0.223	0.219	-2	NA	± 30 %	AverageRF
Bromodichloromethane	100	100	0.567	0.565	0	NA	± 30 %	AverageRF
† Bromoform	100	97	0.383	0.436	NA	-3	± 30 %	Linear
Bromomethane	100	100	0.126	0.161	NA	0	± 30 %	Quadratic
Carbon Disulfide	100	100	1.20	1.22	2	NA	± 30 %	AverageRF
Carbon Tetrachloride	100	87	0.415	0.438	NA	-13	± 30 %	Linear
† Chlorobenzene	100	110	2.16	2.29	6	NA	± 30 %	AverageRF
Chloroethane	100	99	0.393	0.391	-1	NA	± 30 %	AverageRF
‡ Chloroform	100	100	0.675	0.688	2	NA	± 30 %	AverageRF
† Chloromethane	100	85	0.396	0.376	NA	-15	± 30 %	Linear
cis-1,2-Dichloroethene	100	100	0.593	0.593	0	NA	± 30 %	AverageRF
cis-1,3-Dichloropropene	100	110	1.35	1.42	5	NA	± 30 %	AverageRF
Cyclohexane	100	100	0.900	0.934	4	NA	± 30 %	AverageRF
Dibromochloromethane	100	100	0.738	0.751	2	NA	± 30 %	AverageRF
Dichlorodifluoromethane	100	94	0.458	0.432	-6	NA	± 30 %	AverageRF
‡ Ethylbenzene	100	110	1.22	1.34	9	NA	± 30 %	AverageRF
Isopropylbenzene	100	110	1.26	1.40	11	NA	± 30 %	AverageRF
m,p-Xylenes	200	190	1.59	1.88	NA	-4	± 30 %	Linear
Methyl Acetate	100	92	0.376	0.346	-8	NA	± 30 %	AverageRF
Methyl tert-Butyl Ether	100	100	1.15	1.18	3	NA	± 30 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

352

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
ICAL Date: 11/28/2014
Date Analyzed: 11/29/2014

Second Source Calibration Verification
Volatile Organic Compounds by GC/MS

ICAL Type: Internal Standard
Analysis Method: 8260B

ICAL ID: CAL3292
Units: ug/L

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
Methylene Chloride	100	98	0.425	0.416	-2	NA	± 30 %	AverageRF
o-Xylene	100	95	1.52	1.65	NA	-5	± 30 %	Linear
Styrene	100	110	2.43	2.79	NA	5	± 30 %	Linear
Tetrachloroethene (PCE)	100	110	0.529	0.603	14	NA	± 30 %	AverageRF
‡ Toluene	100	110	2.14	2.37	11	NA	± 30 %	AverageRF
trans-1,2-Dichloroethene	100	110	0.594	0.625	5	NA	± 30 %	AverageRF
trans-1,3-Dichloropropene	100	110	1.25	1.37	10	NA	± 30 %	AverageRF
Trichloroethene (TCE)	100	94	0.371	0.423	NA	-6	± 30 %	Linear
Trichlorofluoromethane	100	100	0.509	0.518	2	NA	± 30 %	AverageRF
Trichlorotrifluoroethane	100	99	0.320	0.318	-1	NA	± 30 %	AverageRF
‡ Vinyl Chloride	100	89	0.462	0.409	-11	NA	± 30 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

353

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-023.D Vial: 19
Acq On : 29 Nov 2014 12:16 am Operator: JDB
Sample : ICV-100PPB Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Jan 6 14:02 2015 Quant Results File: 141130W.RES

Quant Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Sun Nov 30 13:16:01 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Fluorobenzene	8.15	96	1196861	50.00	ug/L	0.00
56) Chlorobenzene-d5	11.27	82	631701	50.00	ug/L	0.00
84) 1,4-Dichlorobenzene-d4	13.67	152	512346	50.00	ug/L	0.00
System Monitoring Compounds						
37) Dibromofluoromethane	7.13	111	260162	48.90	ug/L	0.00
Spiked Amount 50.000	Range 86 - 112		Recovery = 97.80%			
41) 1,2-Dichloroethane-d4	7.62	65	326461	47.13	ug/L	0.00
Spiked Amount 50.000	Range 72 - 121		Recovery = 94.26%			
65) Toluene-d8	9.84	98	1284618	49.82	ug/L	0.00
Spiked Amount 50.000	Range 88 - 115		Recovery = 99.64%			
87) 4-Bromofluorobenzene	12.47	95	555033	50.92	ug/L	0.00
Spiked Amount 50.000	Range 86 - 113		Recovery = 101.84%			
Target Compounds						Qvalue
2) Dichlorodifluoromethane	2.14	85	1034608	94.46	ug/L	99
3) Chloromethane (P)	2.37	50	899830	85.02	ug/L	97
4) Vinyl Chloride (C)	2.52	62	979600	88.52	ug/L	98
5) Bromomethane	3.00	96	386500	99.76	ug/L	93
6) Chloroethane	3.15	64	936254	99.42	ug/L #	92
7) 1,2-Dichlorotrifluoroethan	3.70	67	1231053	99.80	ug/L	95
8) Acrolein	3.91	56	222230	370.09	ug/L	93
9) Acetonitrile	4.11	41	98454m	81.09	ug/L	
10) Trichlorofluoromethane	3.70	101	1239486	101.81	ug/L	98
11) Acetone	4.03	43	281465	88.64	ug/L	93
12) Diethyl Ether	4.15	59	876747	98.44	ug/L	95
13) 1,1-Dichloroethene (C)	4.51	61	1438261	101.59	ug/L	96
14) tert-Butyl Alcohol	4.66	59	346353	446.24	ug/L	95
15) Iodomethane	4.71	142	805693	123.69	ug/L	95
16) Acrylonitrile	4.86	53	400279	101.10	ug/L	99
17) Methylene Chloride	4.98	84	994677	97.78	ug/L	88
18) Methyl Acetate	4.85	43	829349	92.11	ug/L	96
19) Allyl Chloride	4.94	41	1673287	102.18	ug/L #	92
20) 1,1,2-Trichlorotrifluoroet	4.59	101	762003	99.40	ug/L	97
21) Carbon Disulfide	5.05	76	2922783	102.06	ug/L	99
22) trans-1,2-Dichloroethene	5.64	61	1496381	105.18	ug/L	94
23) Methyl tert-Butyl Ether	5.64	73	2834827	103.10	ug/L	99
24) 1,1-Dichloroethane (P)	6.01	63	1885118	102.30	ug/L	100
25) Propionitrile	6.17	54	145206	85.51	ug/L #	73
26) Vinyl Acetate	6.08	43	2205497	97.33	ug/L	97
27) Chloroprene	6.28	53	1696608	104.88	ug/L	91
28) Hexane	6.22	57	1932794	88.80	ug/L	97

(#) = qualifier out of range (m) = manual integration
1128-023.D 141130W.M Tue Jan 06 14:04:16 2015

JJa 1/6/15

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-023.D Vial: 19
Acq On : 29 Nov 2014 12:16 am Operator: JDB
Sample : ICV-100PPB Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Jan 6 14:02 2015 Quant Results File: 141130W.RES

Quant Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Sun Nov 30 13:16:01 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Compound	R.T.	QIon	Response	Conc Unit	Qvalue
29) 2-Butanone (MEK)	6.44	43	469127	94.35 ug/L #	92
30) Diisopropyl Ether	6.37	45	3720309	98.77 ug/L	95
31) Methacrylonitrile	6.61	67	442291	98.58 ug/L	84
32) cis-1,2-Dichloroethene	6.71	61	1419968	99.95 ug/L	89
33) Ethyl Acetate	6.80	70	113878	82.53 ug/L #	81
34) Bromochloromethane	6.99	130	523962	98.22 ug/L	90
35) Chloroform (C)	6.96	83	1647148	101.98 ug/L	99
36) 2,2-Dichloropropane	6.82	77	1262386	85.84 ug/L #	92
38) tert-Butyl Ethyl Ether	6.83	59	3504879	103.38 ug/L	97
39) Isobutyl Alcohol	7.05	43	27097	75.72 ug/L #	91
40) Tetrahydrofuran	7.17	72	249945	193.62 ug/L	85
42) 1,2-Dichloroethane	7.72	62	1238553	95.48 ug/L #	82
43) 1,1,1-Trichloroethane	7.52	97	1305663	90.95 ug/L	97
44) 1,1-Dichloropropene	7.74	75	1400812	90.10 ug/L	97
45) Cyclohexane	7.80	56	2235943	103.76 ug/L	93
46) Isopropyl Acetate	7.80	43	2252819	100.68 ug/L	97
47) Carbon Tetrachloride	7.86	117	1049602	86.92 ug/L	99
48) Benzene	7.90	78	4546566	107.74 ug/L	97
49) tert-Amyl Methyl Ether	8.07	43	957334	94.90 ug/L #	74
50) Dibromomethane	8.80	93	601730	83.97 ug/L	91
51) 1,2-Dichloropropane (C)	8.69	63	1212129	99.06 ug/L	96
52) 2-Nitropropane	8.95	43	855068	99.52 ug/L #	98
53) Trichloroethene	8.65	130	1012520	94.43 ug/L	97
54) Bromodichloromethane	8.87	83	1352911	99.62 ug/L	98
55) 1,4-Dioxane	8.85	88	14921m	127.94 ug/L	
57) Methyl Methacrylate	8.81	69	871606	107.39 ug/L	91
58) n-Propyl Acetate	8.83	43	1555406	97.92 ug/L	98
59) Methyl Cyclohexane	9.03	83	2219970	103.82 ug/L	98
60) 2-Chloroethyl Vinyl Ether	9.21	63	749307	104.01 ug/L	95
61) cis-1,3-Dichloropropene	9.43	75	1790403	105.28 ug/L	98
62) 4-Methyl-2-pentanone (MIBK	9.36	43	992397	96.04 ug/L #	94
63) trans-1,3-Dichloropropene	9.91	75	1731407	109.89 ug/L	88
64) 1,1,2-Trichloroethane	10.06	83	839054	98.34 ug/L	95
66) Toluene (C)	9.91	92	2991059	110.60 ug/L	98
67) 1,3-Dichloropropane	10.27	76	1683627	98.98 ug/L	98
68) Ethyl Methacrylate	10.09	69	1484978	101.15 ug/L #	74
69) 2-Hexanone	10.20	43	662013	95.92 ug/L	94
70) Dibromochloromethane	10.54	129	948490	101.68 ug/L	97
71) 1,2-Dibromoethane (EDB)	10.75	107	859237	100.33 ug/L	99
72) Tetrachloroethene	10.65	164	761591	113.85 ug/L	94
73) 1,1,1,2-Tetrachloroethane	11.34	131	880559	105.15 ug/L	99

(#) = qualifier out of range (m) = manual integration

Quantitation Report (QT Reviewed)

Data File : I:\MS52\DATA\MS52-141128\1128-023.D Vial: 19
Acq On : 29 Nov 2014 12:16 am Operator: JDB
Sample : ICV-100PPB Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Jan 6 14:02 2015 Quant Results File: 141130W.RES

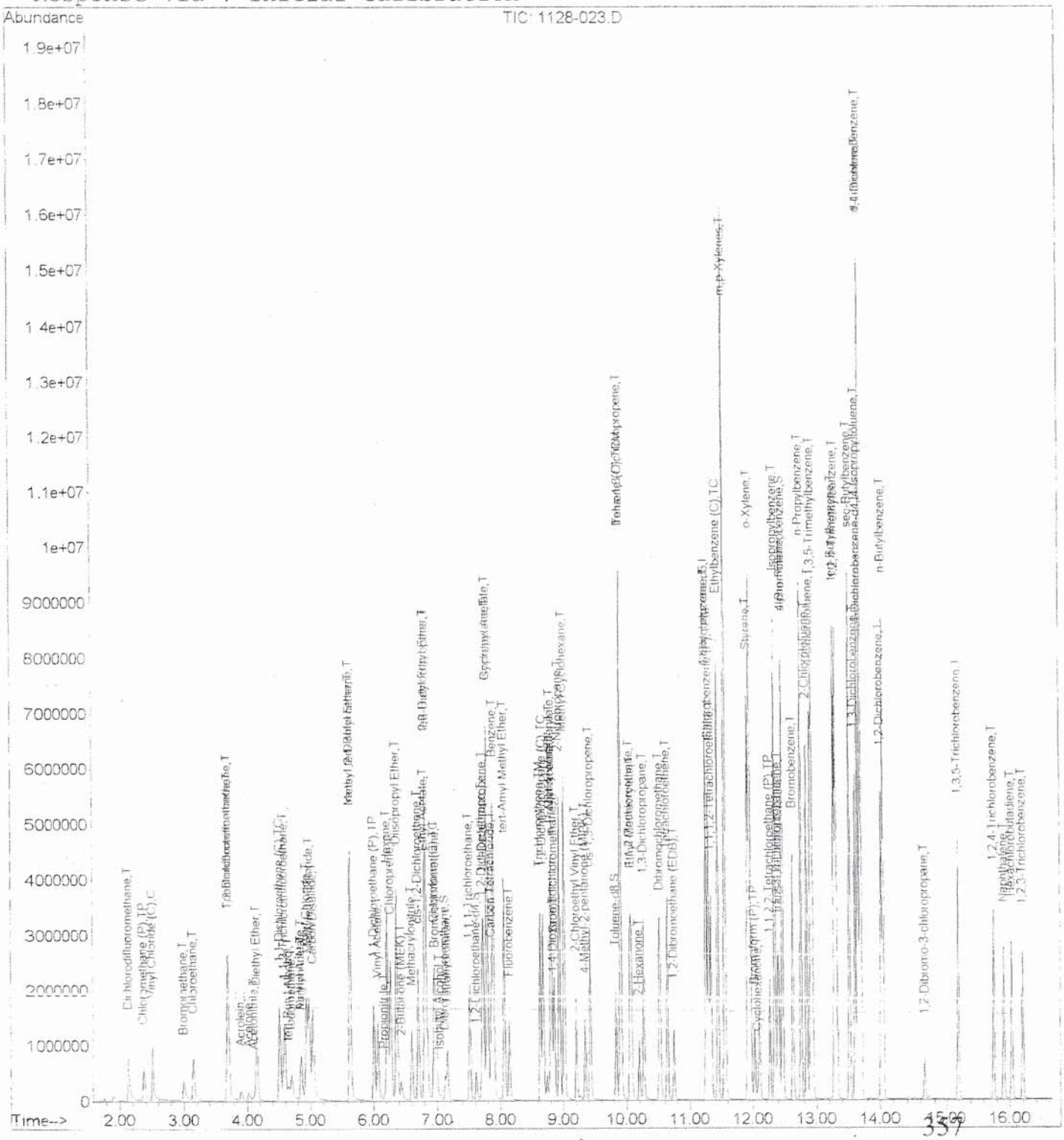
Quant Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Sun Nov 30 13:16:01 2014
Response via : Initial Calibration
DataAcq Meth : 141118W

Compound	R.T.	QIon	Response	Conc Unit	Qvalue
74) 1-Chlorohexane	11.26	91	1748570	102.91 ug/L	89
75) Chlorobenzene (P)	11.31	112	2887706	105.88 ug/L	94
76) Ethylbenzene (C)	11.45	106	1689987	109.36 ug/L	95
77) m,p-Xylenes	11.57	106	4754833	192.26 ug/L	92
78) Bromoform (P)	12.03	173	550880	96.89 ug/L	100
79) Cyclohexanone	12.08	55	68169	195.22 ug/L #	18
80) Styrene	11.92	104	3530465	105.47 ug/L	92
81) 1,1,2,2-Tetrachloroethane	12.27	83	1105048	93.14 ug/L	99
82) o-Xylene	11.96	106	2090926	95.22 ug/L #	90
83) 1,2,3-Trichloropropane	12.40	110	306350	91.73 ug/L #	64
85) trans-1,4-Dichloro-2-buten	12.42	53	345797	85.77 ug/L #	1
86) Isopropylbenzene	12.35	120	1430807	111.01 ug/L	97
88) alpha-Pinene	12.48	93	2796004	101.30 ug/L	96
89) Bromobenzene	12.63	77	2071890	102.48 ug/L #	83
90) n-Propylbenzene	12.76	120	1482971	111.10 ug/L	83
91) 2-Chlorotoluene	12.85	126	1125800	106.70 ug/L	85
92) 4-Chlorotoluene	12.91	126	1229798	110.01 ug/L	98
93) 1,3,5-Trimethylbenzene	12.94	120	2204307	112.35 ug/L	98
94) tert-Butylbenzene	13.28	91	3055276	120.00 ug/L	95
95) 1,2,4-Trimethylbenzene	13.31	120	2415837	109.37 ug/L #	72
96) sec-Butylbenzene	13.52	134	1128507	109.60 ug/L	99
97) 1,3-Dichlorobenzene	13.61	146	2212092	108.35 ug/L	97
98) d-Limonene	13.70	68	2140689	103.31 ug/L #	93
99) 1,4-Dichlorobenzene	13.71	146	2632444	94.64 ug/L	97
100) 4-Isopropyltoluene	13.66	134	1327502	98.53 ug/L	90
101) 1,2-Dichlorobenzene	14.03	146	2039454	105.08 ug/L	98
102) n-Butylbenzene	14.06	92	2687784	99.67 ug/L	98
103) 1,2-Dibromo-3-chloropropan	14.67	157	181029	97.03 ug/L	83
104) 1,3,5-Trichlorobenzene	15.19	180	1316386	103.73 ug/L	98
105) 1,2,4-Trichlorobenzene	15.76	180	995174	107.01 ug/L	96
106) Naphthalene	15.92	128	2109806	107.42 ug/L	99
107) Hexachlorobutadiene	16.04	225	507290	105.07 ug/L	98
108) 1,2,3-Trichlorobenzene	16.20	180	777124	104.88 ug/L	99

(#) = qualifier out of range (m) = manual integration

Data File : I:\MS52\DATA\MS52-141128\1128-023.D Vial: 19
Acq On : 29 Nov 2014 12:16 am Operator: JDB
Sample : ICV-100PPB Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Jan 6 14:02 2015 Quant Results File: 141130W.RES

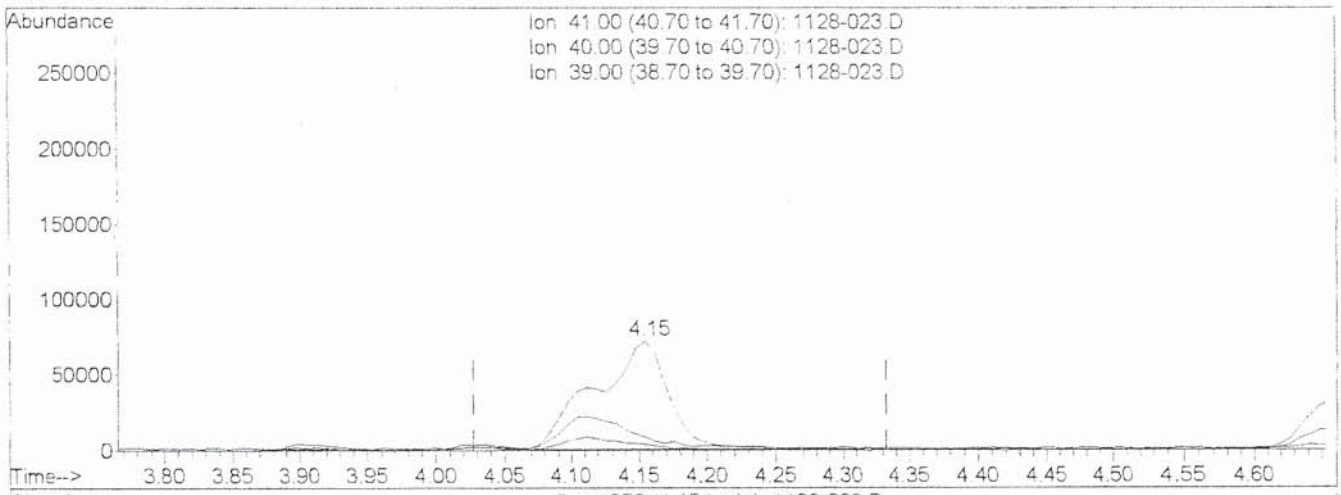
Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Wed Dec 31 08:28:40 2014
Response via : Initial Calibration

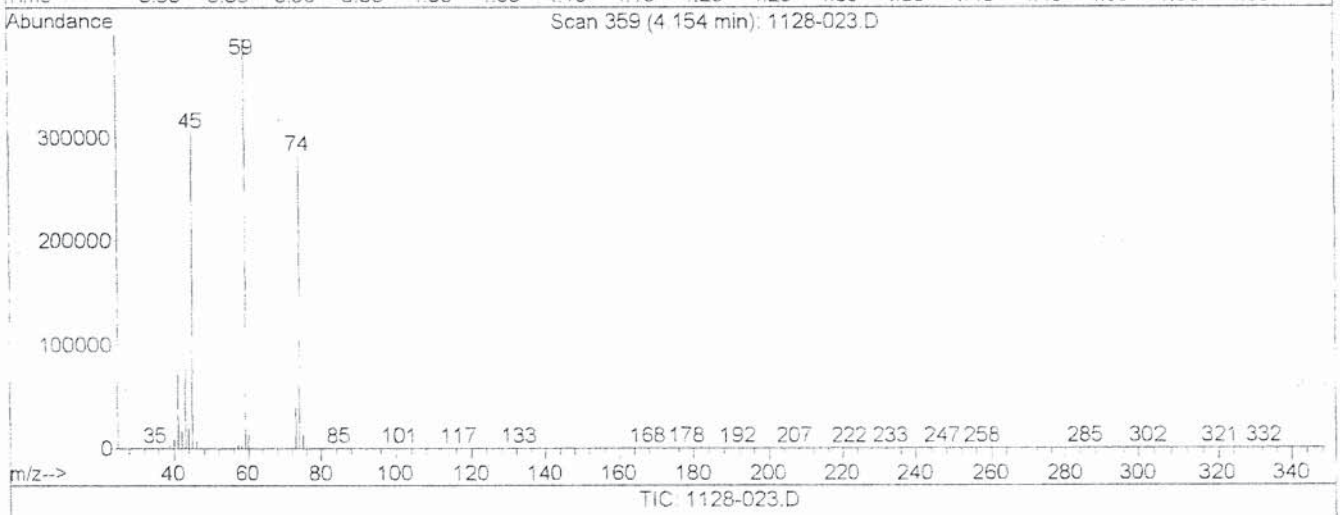


Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-023.D Vial: 19
Acq On : 29 Nov 2014 12:16 am Operator: JDB
Sample : ICV-100PPB Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Nov 30 13:18 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Wed Dec 31 08:28:40 2014
Response via : Multiple Level Calibration





TIC: 1128-023.D

(9) Acetonitrile (T)

4.15min 224.40ug/L

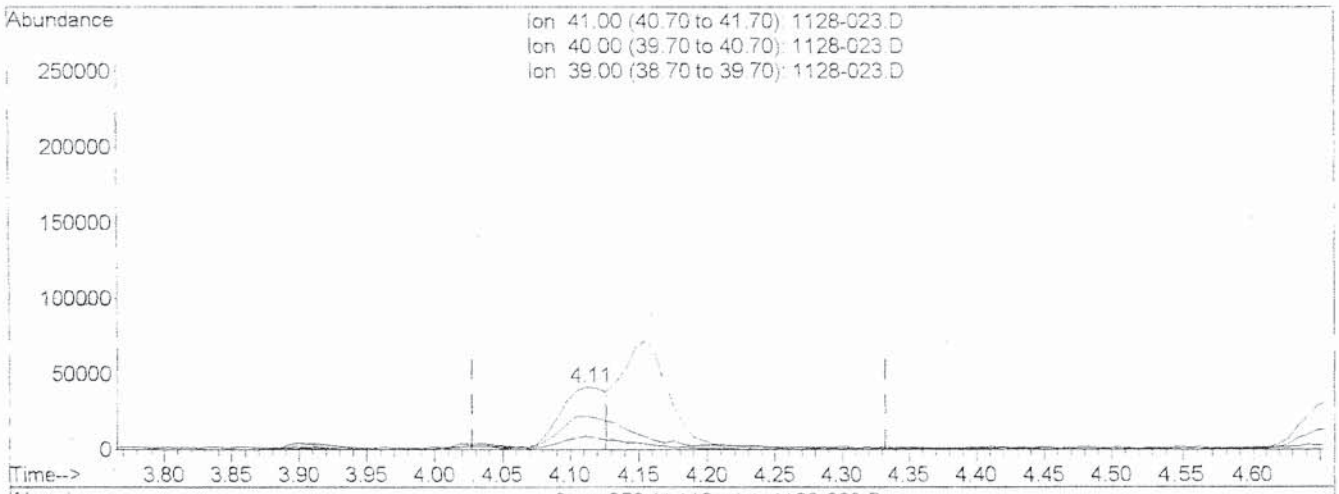
response 272438

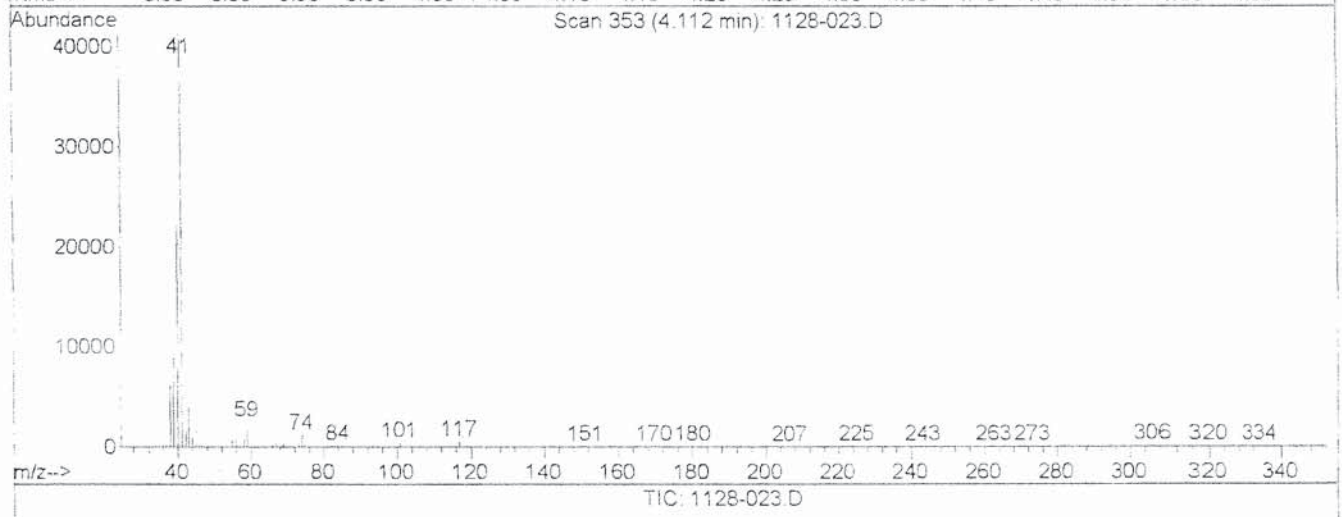
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	28.78#
39.00	15.40	11.46#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-023.D Vial: 19
Acq On : 29 Nov 2014 12:16 am Operator: JDB
Sample : ICV-100PPB Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Jan 6 14:01 2015 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Wed Dec 31 08:28:40 2014
Response via : Multiple Level Calibration





TIC: 1128-023.D

(9) Acetonitrile (T)

4.11min 81.09ug/L m

response 98454

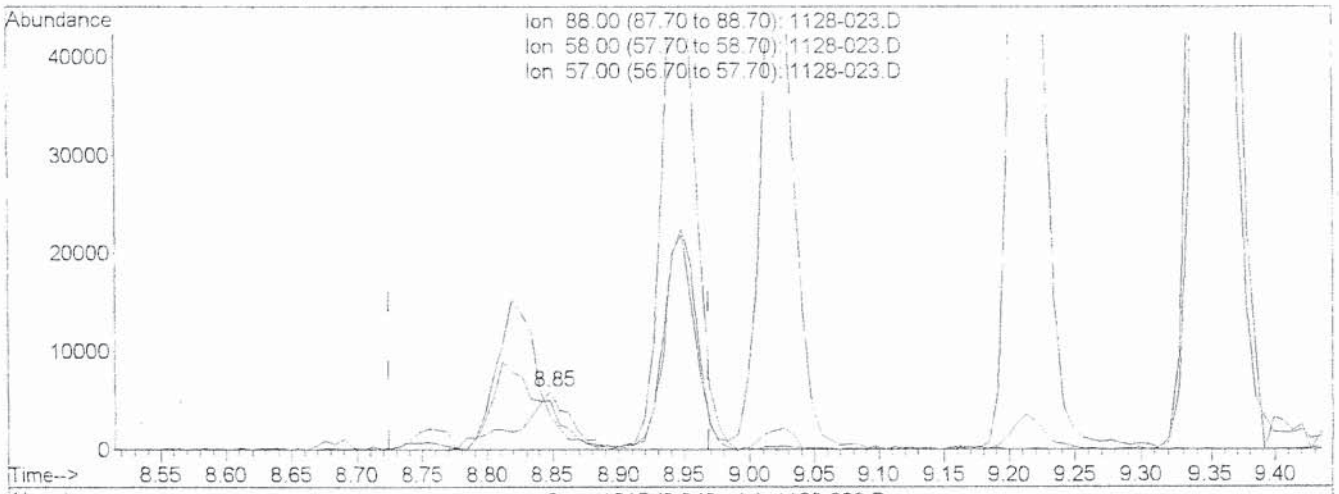
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	79.64#
39.00	15.40	31.70#
0.00	0.00	0.00

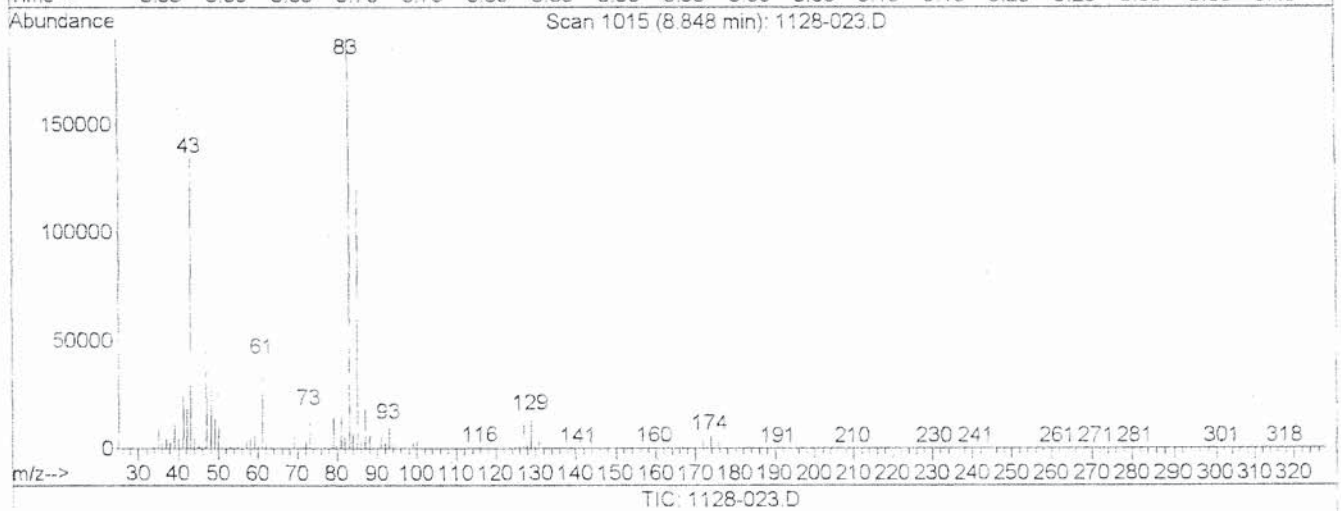
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST JDG
DATE 1/6/15

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-023.D Vial: 19
Acq On : 29 Nov 2014 12:16 am Operator: JDB
Sample : ICV-100PPB Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Jan 6 14:01 2015 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Wed Dec 31 08:28:40 2014
Response via : Multiple Level Calibration





TIC: 1128-023.D

(55) 1,4-Dioxane (T)

8.85min 134.06ug/L

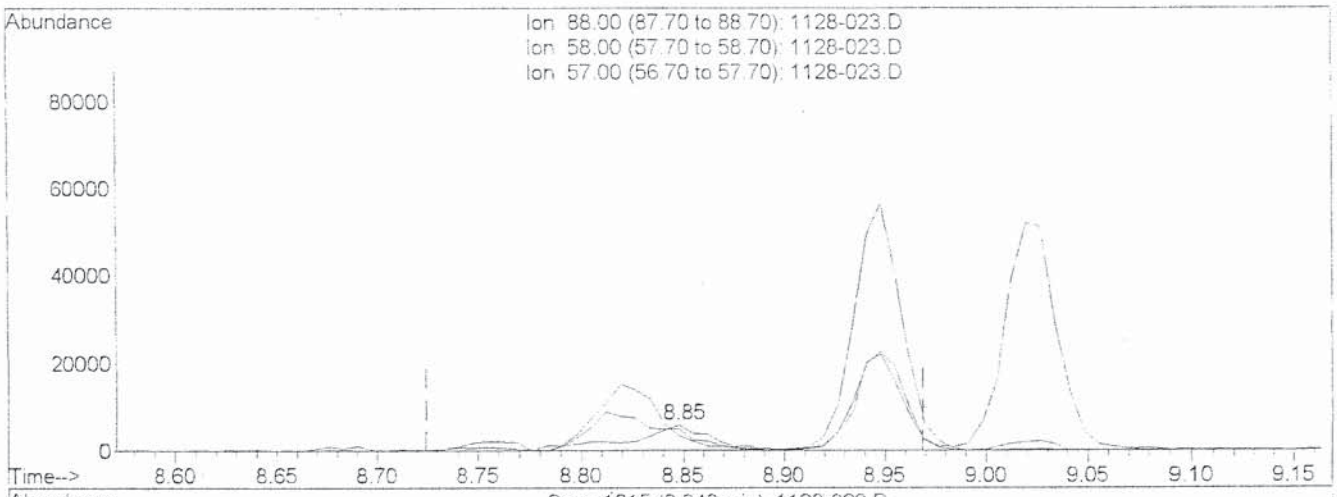
response 15634

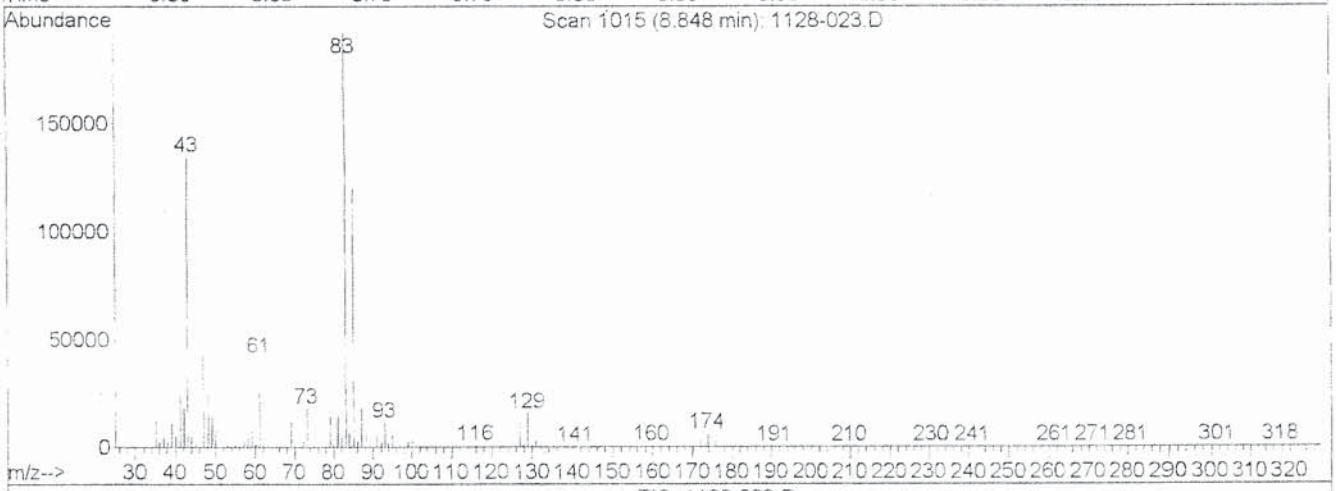
ion	Exp%	Act%
88.00	100	100
58.00	78.40	155.42#
57.00	39.40	221.80#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141128\1128-023.D Vial: 19
Acq On : 29 Nov 2014 12:16 am Operator: JDB
Sample : ICV-100PPB Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Jan 6 14:02 2015 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Wed Dec 31 08:28:40 2014
Response via : Multiple Level Calibration





TIC: 1128-023.D

(55) 1,4-Dioxane (T)

8.85min 127.94ug/L m

response 14921

Ion	Exp%	Act%
88.00	100	100
58.00	78.40	162.84#
57.00	39.40	232.40#
0.00	0.00	0.00

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST DJG
DATE 1/6/15

Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
Date Analyzed: 12/23/2014

Continuing Calibration Verification Summary
Volatile Organic Compounds by GC/MS

ICAL Type: Internal Standard
Analysis Method: 8260B

ICAL Date: 11/28/2014
ICAL ID: CAL3292
Analysis Lot: JWG1500319
Units: ug/L

File ID: I:\MS52\DATA\MS52-141223\1223-002.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,1,1,2-Tetrachloroethane	50	47	0.01	0.663	0.619	-7	NA	± 30 %	AverageRF
1,1,1-Trichloroethane (TCA)	50	42	0.01	0.508	0.458	NA	-15	± 30 %	Linear
† 1,1,2,2-Tetrachloroethane	50	50	0.3	0.939	0.947	1	NA	± 30 %	AverageRF
1,1,2-Trichloroethane	50	46	0.01	0.675	0.626	-7	NA	± 30 %	AverageRF
† 1,1-Dichloroethane	50	48	0.1	0.770	0.732	-5	NA	± 30 %	AverageRF
‡ 1,1-Dichloroethene	50	47	0.01	0.591	0.554	-6	NA	± 20 %	AverageRF
1,2,3-Trichlorobenzene	50	49	0.01	0.723	0.705	-2	NA	± 30 %	AverageRF
1,2,4-Trichlorobenzene	50	47	0.01	0.908	0.855	-6	NA	± 30 %	AverageRF
1,2-Dibromo-3-chloropropane (DBCP	50	49	0.01	0.182	0.177	-3	NA	± 30 %	AverageRF
1,2-Dibromoethane (EDB)	50	47	0.01	0.678	0.639	-6	NA	± 30 %	AverageRF
1,2-Dichlorobenzene	50	47	0.01	1.89	1.80	-5	NA	± 30 %	AverageRF
1,2-Dichloroethane (EDC)	50	48	0.01	0.542	0.519	-4	NA	± 30 %	AverageRF
1,2-Dichloroethane-d4	50	50		0.289	0.287	-1	NA	± 30 %	AverageRF
‡ 1,2-Dichloropropane	50	46	0.01	0.511	0.469	-8	NA	± 20 %	AverageRF
1,3-Dichlorobenzene	50	47	0.01	1.99	1.88	-6	NA	± 30 %	AverageRF
1,4-Dichlorobenzene	50	40	0.01	2.26	2.06	NA	-19	± 30 %	Linear
2-Butanone (MEK)	50	45	0.01	0.208	0.188	-10	NA	± 30 %	AverageRF
2-Hexanone	50	52	0.01	0.546	0.567	4	NA	± 30 %	AverageRF
4-Bromofluorobenzene	50	49		1.06	1.04	-2	NA	± 30 %	AverageRF
4-Methyl-2-pentanone (MIBK)	50	52	0.01	0.818	0.845	3	NA	± 30 %	AverageRF
Acetone	50	45	0.01	0.133	0.120	-9	NA	± 30 %	AverageRF
Benzene	50	46	0.01	1.76	1.63	-8	NA	± 30 %	AverageRF
Bromochloromethane	50	45	0.01	0.223	0.203	-9	NA	± 30 %	AverageRF
Bromodichloromethane	50	45	0.01	0.567	0.509	-10	NA	± 30 %	AverageRF
† Bromoform	50	46	0.1	0.383	0.406	NA	-8	± 30 %	Linear
Bromomethane	50	43	0.01	0.126	0.121	NA	-14	± 30 %	Quadratic
Carbon Disulfide	50	47	0.01	1.20	1.12	-7	NA	± 30 %	AverageRF
Carbon Tetrachloride	50	44	0.01	0.415	0.391	NA	-12	± 30 %	Linear
† Chlorobenzene	50	47	0.3	2.16	2.03	-6	NA	± 30 %	AverageRF
Chloroethane	50	42	0.01	0.393	0.332	-16	NA	± 30 %	AverageRF
‡ Chloroform	50	46	0.01	0.675	0.624	-8	NA	± 20 %	AverageRF
† Chloromethane	50	42	0.1	0.396	0.357	NA	-15	± 30 %	Linear
cis-1,2-Dichloroethene	50	48	0.01	0.593	0.568	-4	NA	± 30 %	AverageRF
cis-1,3-Dichloropropene	50	50	0.01	1.35	1.34	0	NA	± 30 %	AverageRF
Cyclohexane	50	45	0.01	0.900	0.804	-11	NA	± 30 %	AverageRF
Dibromochloromethane	50	46	0.01	0.738	0.686	-7	NA	± 30 %	AverageRF
Dibromofluoromethane	50	49		0.222	0.218	-2	NA	± 30 %	AverageRF
Dichlorodifluoromethane	50	20	0.01	0.458	0.186	-59 *	NA	± 30 %	AverageRF
‡ Ethylbenzene	50	46	0.01	1.22	1.12	-9	NA	± 20 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

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Client: Tetra Tech NUS, Inc.
Project: LC39/112G06925

Service Request: J1409737
Date Analyzed: 12/23/2014

Continuing Calibration Verification Summary
Volatile Organic Compounds by GC/MS

ICAL Type: Internal Standard
Analysis Method: 8260B

ICAL Date: 11/28/2014
ICAL ID: CAL3292
Analysis Lot: JWG1500319
Units: ug/L

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Isopropylbenzene	50	46	0.01	1.26	1.15	-9	NA	± 30 %	AverageRF
m,p-Xylenes	100	80	0.01	1.59	1.47	NA	-20	± 30 %	Linear
Methyl Acetate	50	46	0.01	0.376	0.348	-7	NA	± 30 %	AverageRF
Methyl tert-Butyl Ether	50	45	0.01	1.15	1.03	-11	NA	± 30 %	AverageRF
Methylene Chloride	50	45	0.01	0.425	0.382	-10	NA	± 30 %	AverageRF
o-Xylene	50	43	0.01	1.52	1.43	NA	-14	± 30 %	Linear
Styrene	50	44	0.01	2.43	2.39	NA	-13	± 30 %	Linear
Tetrachloroethene (PCE)	50	46	0.01	0.529	0.486	-8	NA	± 30 %	AverageRF
‡ Toluene	50	46	0.01	2.14	1.97	-8	NA	± 20 %	AverageRF
Toluene-d8	50	50		2.04	2.05	0	NA	± 30 %	AverageRF
trans-1,2-Dichloroethene	50	47	0.01	0.594	0.561	-6	NA	± 30 %	AverageRF
trans-1,3-Dichloropropene	50	50	0.01	1.25	1.24	-1	NA	± 30 %	AverageRF
Trichloroethene (TCE)	50	41	0.01	0.371	0.342	NA	-19	± 30 %	Linear
Trichlorofluoromethane	50	39	0.01	0.509	0.399	-22	NA	± 30 %	AverageRF
Trichlorotrifluoroethane	50	48	0.01	0.320	0.307	-4	NA	± 30 %	AverageRF
‡ Vinyl Chloride	50	53	0.01	0.462	0.489	6	NA	± 20 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† **SPCC Compound** ‡ **CCC Compound**

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Quantitation Report

Data File:	I:\MS52\DATA\MS52-141223\1223-002.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 12:30	**Quant Date:**	12/23/2014 13:04	**Vial:**	2
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	JWG1500319-2			**Soln Conc. Units:**	ug/L

Bottle ID:		**Tier:**		**Matrix:**	WATER
Prod Code:	8260B	**Collect Date:**		**Receive Date:**	02/11/2015

Analysis Lot:	JWG1500319	**Prep Lot:**		**Report Group:**	
Analysis Method:	8260B	**Prep Method:**			
Prep Ref:		**Prep Date:**			

Quant Method:	C:\HPCHEM\1\METHODS\141130W.M	**Calibration ID:**	CAL3292
Title:			
Tune Ref:	I:\MS52\DATA\MS52-141223\1223-001.D	**Method ID:**	MJ100
MB Ref:		**Quant based on Method**	

Internal Standard Compounds

IS Ref	Parameter Name	RT	RT Dev	Quant Mass	Response	Solution Conc	Area Criteria
1	Fluorobenzene	8.15	0.00	96	1303711	50.00	OK
2	Chlorobenzene-d5	11.27	0.00	82	678364	50.00	OK
3	1,4-Dichlorobenzene-d4	13.67	0.00	152	552311	50.00	OK

Surrogate Compounds

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	%Rec	%Rec Limits		Rpt?
1	Dibromofluoromethane	7.13			111	284578	49.11		86-112	NA	
1	1,2-Dichloroethane-d4	7.63			65	374746	49.66		72-121	NA	
2	Toluene-d8	9.84			98	1388281	50.14		88-115	NA	
3	4-Bromofluorobenzene	12.46			95	575415	48.97		86-113	NA	

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Dichlorodifluoromethane	2.14			85	242159	20.30			
1	Chloromethane	2.38			50	465439	42.45			
1	Vinyl Chloride	2.52			62	637825	52.91			
1	Bromomethane	3.00			96	157221	43.23			
1	Chloroethane	3.15			64	432826	42.20			
1	1,2-Dichloro-1,1,2-trifluoroethan	3.70			67	590531	43.95			
1	Acrolein	3.91			56	44804	125.09			
1	Acetonitrile	4.12			41	50319**m**	38.05			
1	Trichlorofluoromethane	3.70			101	519777	39.19			
1	Acetone	4.03			43	156989	45.39			
1	Ethyl Ether	4.16			59	454510	46.85			
1	1,1-Dichloroethene	4.52			61	721782	46.80			
1	tert-Butyl Alcohol	4.66			59	163675**m**	193.59			
1	Iodomethane (Methyl Iodide)	4.71			142	279092	40.94			

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-002.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 12:30	**Quant Date:**	12/23/2014 13:04	**Vial:**	2
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	JWG1500319-2			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
1	Acrylonitrile	4.86			53	211985	49.15			
1	Methylene Chloride	4.99			84	498221	44.96			
1	Methyl Acetate	4.85			43	454028	46.29			
1	Allyl Chloride	4.94			41	839107	47.04			
1	Trichlorotrifluoroethane	4.59			101	399699	47.87			
1	Carbon Disulfide	5.05			76	1455610	46.66			
1	trans-1,2-Dichloroethene	5.64			61	730945	47.17			
1	Methyl tert-Butyl Ether	5.64			73	1336928	44.64			
1	1,1-Dichloroethane	6.02			63	954852	47.57			
1	Propionitrile	6.18			54	74995	43.37			
1	Vinyl Acetate	6.08			43	1185479	48.03			
1	Chloroprene	6.27			53	727599	41.29			
1	n-Hexane	6.22			57	943228	41.84			
1	2-Butanone (MEK)	6.44			43	244545	45.15			
1	Diisopropyl Ether	6.37			45	1973669	48.10			
1	Methacrylonitrile	6.61			67	232659	47.61			
1	cis-1,2-Dichloroethene	6.71			61	740076	47.83			
1	Ethyl Acetate	6.80			70	62290	46.37			
1	Bromochloromethane	6.99			130	264179	45.47			
1	Chloroform	6.96			83	813595	46.24			
1	2,2-Dichloropropane	6.82			77	647315	43.56			
1	tert-Butyl Ethyl Ether	6.82			59	1712681	46.38			
1	Isobutyl Alcohol	7.05			43	13249	41.21			
1	Tetrahydrofuran	7.17			72	137881	98.06			
1	1,2-Dichloroethane (EDC)	7.72			62	676979	47.91			
1	1,1,1-Trichloroethane (TCA)	7.52			97	596518	42.49			
1	1,1-Dichloropropene	7.74			75	735076	46.93			
1	Cyclohexane	7.80			56	1048509	44.67			
1	Isopropyl Acetate	7.80			43	1219212	50.02		N	
1	Carbon Tetrachloride	7.86			117	509488	43.84			
1	Benzene	7.89			78	2122058	46.16			
1	tert-Amyl Methyl Ether	8.07			43	523489	47.64			
1	Dibromomethane	8.81			93	313247	44.71			
1	1,2-Dichloropropane	8.69			63	611211	45.86			
1	2-Nitropropane	8.95			43	428635	45.80			
1	Trichloroethene (TCE)	8.64			130	445964	40.66			
1	Bromodichloromethane	8.86			83	662971	44.82			
1	1,4-Dioxane	8.86			88	7345m	57.82			
2	Methyl Methacrylate	8.81			69	429709	49.30			
2	n-Propyl Acetate	8.83			43	888196	52.07			
2	Methylcyclohexane	9.02			83	1076056	46.86			
2	2-Chloroethyl Vinyl Ether	9.21			63	346955	44.85			
2	cis-1,3-Dichloropropene	9.44			75	910540	49.86			

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-002.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 12:30	**Quant Date:**	12/23/2014 13:04	**Vial:**	2
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	JWG1500319-2			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
2	4-Methyl-2-pentanone (MIBK)	9.35			43	573332	51.67			
2	trans-1,3-Dichloropropene	9.90			75	839426	49.61			
2	1,1,2-Trichloroethane	10.06			83	424556	46.34			
2	Toluene	9.91			92	1337048	46.04			
2	1,3-Dichloropropane	10.27			76	898130	49.17			
2	Ethyl Methacrylate	10.08			69	760747	47.58			
2	2-Hexanone	10.20			43	384540	51.89			
2	Dibromochloromethane	10.54			129	465058	46.43			
2	1,2-Dibromoethane (EDB)	10.75			107	433167	47.10			
2	Tetrachloroethene (PCE)	10.64			164	329387	45.85			
2	1,1,1,2-Tetrachloroethane	11.35			131	419573	46.66			
2	1-Chlorohexane	11.26			91	852228	46.71			
2	Chlorobenzene	11.30			112	1379781	47.11			
2	Ethylbenzene	11.45			106	758271	45.69			
2	m,p-Xylenes	11.56			106	1999460	80.22			
2	Bromoform	12.03			173	275114	46.11			
2	Cyclohexanone	12.08			55	32887	87.70			
2	Styrene	11.93			104	1619616	43.57			
2	1,1,2,2-Tetrachloroethane	12.28			83	642393	50.42			
2	o-Xylene	11.95			106	968522	43.12			
2	1,2,3-Trichloropropane	12.40			110	163244	45.52			
3	trans-1,4-Dichloro-2-butene	12.42			53	206525	47.52			
3	Isopropylbenzene	12.35			120	633925	45.63			
3	alpha-Pinene	12.47			93	1316921	44.26			
3	Bromobenzene	12.63			77	1023219	46.95			
3	n-Propylbenzene	12.76			120	679665	47.23			
3	2-Chlorotoluene	12.85			126	545314	47.94			
3	4-Chlorotoluene	12.91			126	583225	48.40			
3	1,3,5-Trimethylbenzene	12.93			120	1008804	47.70			
3	tert-Butylbenzene	13.28			91	1464204	53.35			
3	1,2,4-Trimethylbenzene	13.31			120	1129552	47.44			
3	sec-Butylbenzene	13.51			134	528926	47.65			
3	1,3-Dichlorobenzene	13.61			146	1035782	47.06			
3	d-Limonene	13.70			68	1046653	46.86			
3	1,4-Dichlorobenzene	13.70			146	1137489	40.43			
3	4-Isopropyltoluene	13.66			134	616753	43.64			
3	1,2-Dichlorobenzene	14.03			146	992914	47.46			
3	n-Butylbenzene	14.06			92	1355946	46.90			
3	1,2-Dibromo-3-chloropropane (D	14.67			157	97911	48.68			
3	1,3,5-Trichlorobenzene	15.19			180	620982	45.39			
3	1,2,4-Trichlorobenzene	15.75			180	472099	47.09			
3	Naphthalene	15.91			128	1159691	54.77			

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Data File:	I:\MS52\DATA\MS52-141223\1223-002.D			**Instrument:**	ms52
Acqu Date:	12/23/2014 12:30	**Quant Date:**	12/23/2014 13:04	**Vial:**	2
Run Type:	CCV			**Dilution:**	1.0
Lab ID:	JWG1500319-2			**Soln Conc. Units:**	ug/L

Target Compounds

Final Conc. Units: ug/L

IS Ref	Parameter Name	RT	RT Dev	RRT Dev	Quant Mass	Response	Solution Conc	Final Conc	Q	Rpt?
3	Hexachlorobutadiene	16.03			225	236327	45.40			
3	1,2,3-Trichlorobenzene	16.20			180	389550	48.77			

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

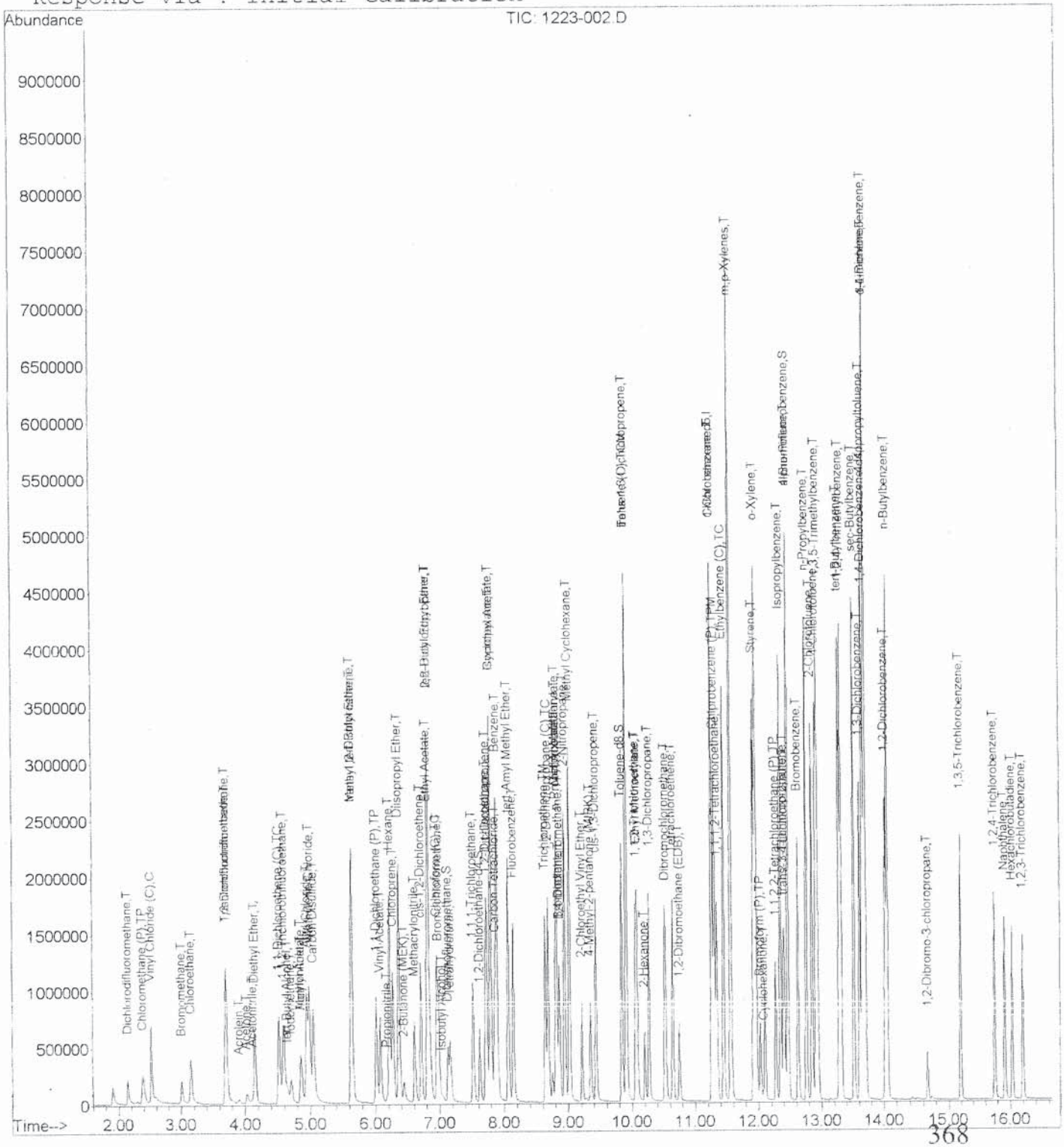
D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Quantitation Report

Data File : I:\MS52\DATA\MS52-141223\1223-002.D Vial: 2
Acq On : 23 Dec 2014 12:30 pm Operator: SGA
Sample : CCV Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 23 13:04 2014 Quant Results File: 141130W.RES

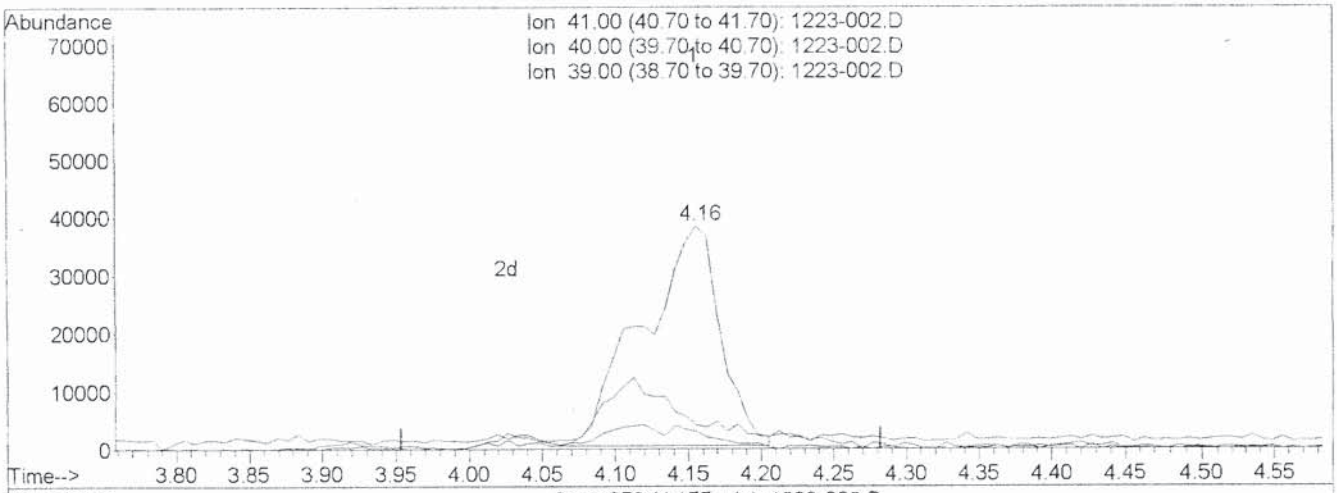
Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Initial Calibration

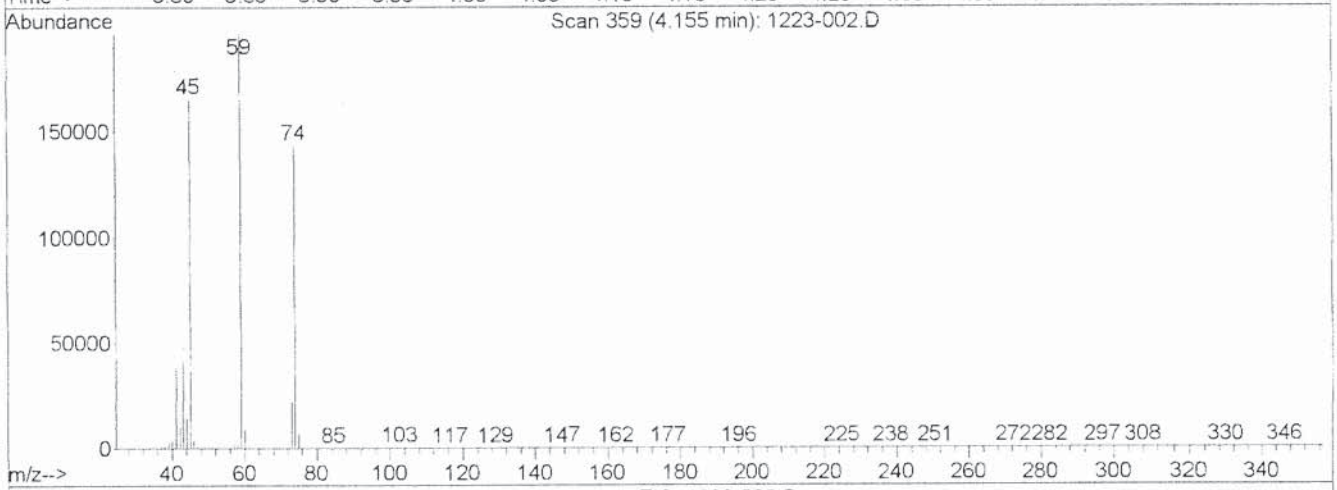


Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141223\1223-002.D Vial: 2
Acq On : 23 Dec 2014 12:30 pm Operator: SGA
Sample : CCV Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 23 12:47 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Multiple Level Calibration





TIC: 1223-002.D

(9) Acetonitrile (T)

4.16min 106.14ug/L

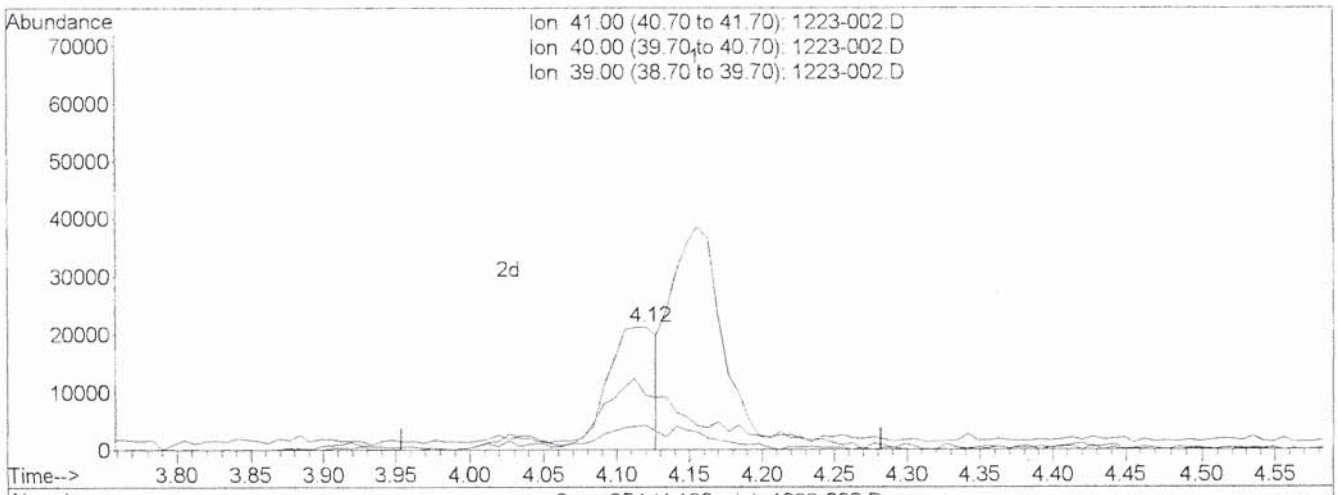
response 140362

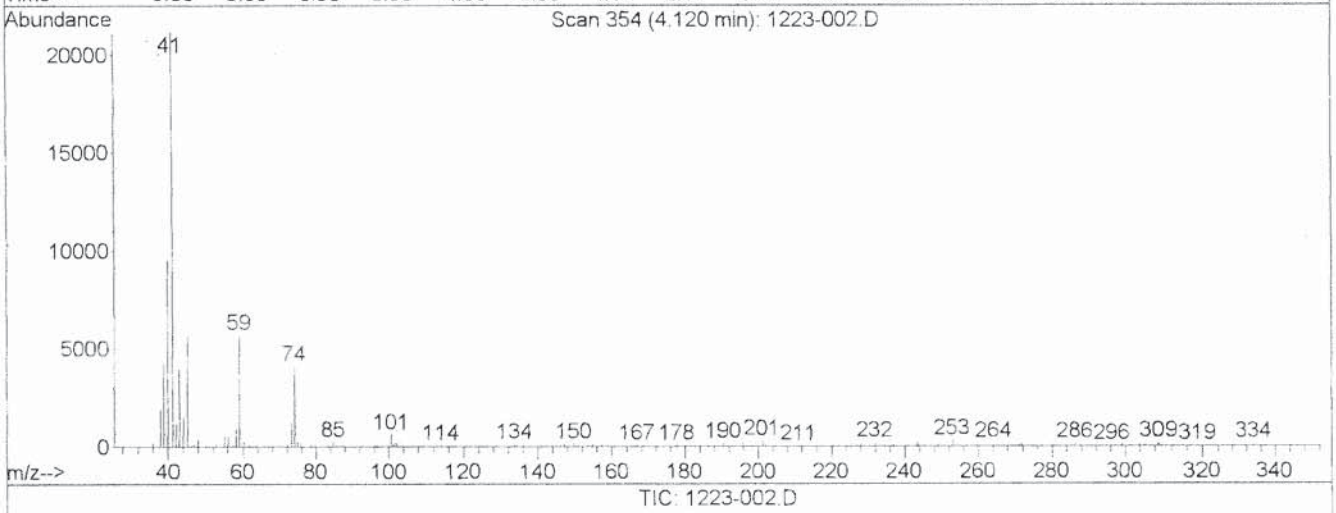
Ion	Exp%	Act%
41.00	100	100
40.00	49.00	0.00#
39.00	15.40	5.76#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141223\1223-002.D Vial: 2
Acq On : 23 Dec 2014 12:30 pm Operator: SGA
Sample : CCV Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 23 13:03 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Multiple Level Calibration





TIC: 1223-002.D

(9) Acetonitrile (T)

4.12min 38.05ug/L m

response 50319

Ion	Exp%	Act%
41.00	100	100
40.00	49.00	0.00#
39.00	15.40	16.06
0.00	0.00	0.00

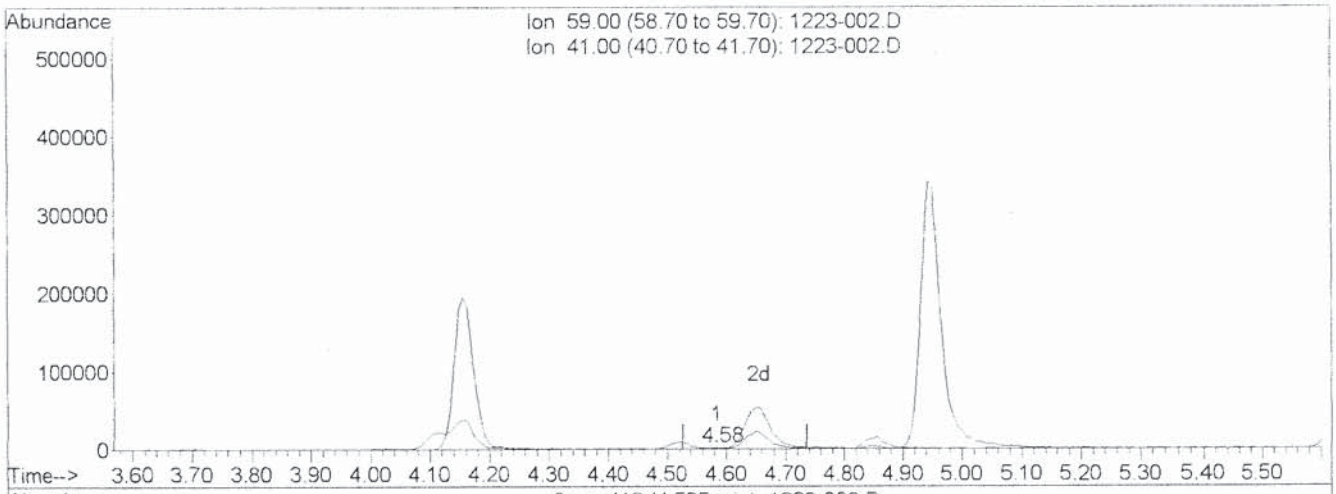
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 12-23-14

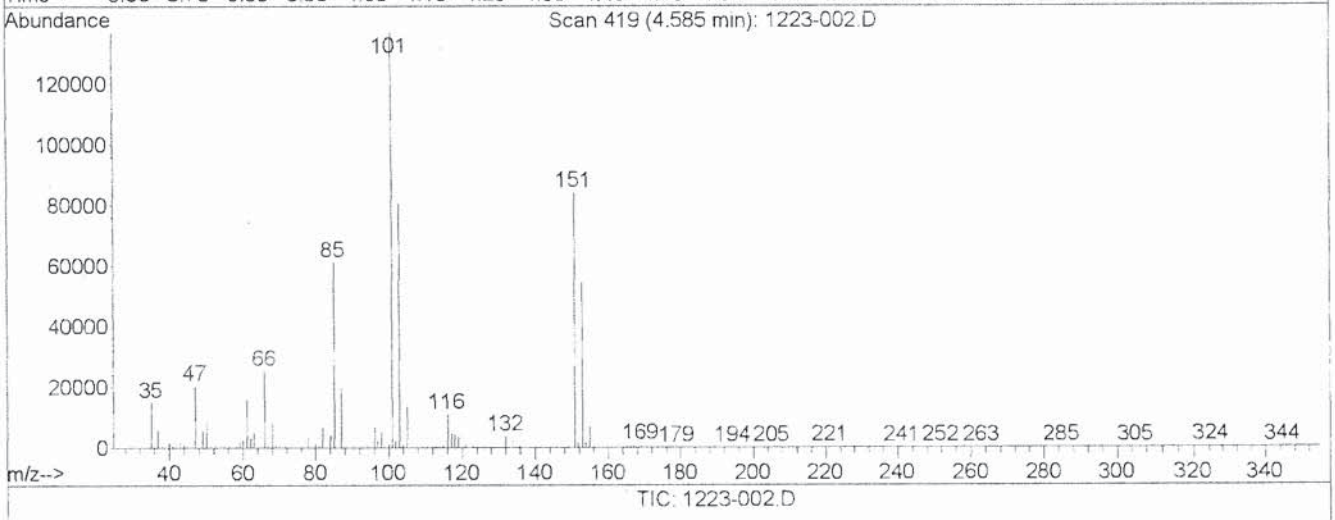
1223-002.D 141130W.M Tue Dec 23 13:03:20 2014

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141223\1223-002.D Vial: 2
Acq On : 23 Dec 2014 12:30 pm Operator: SGA
Sample : CCV Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 23 13:03 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Multiple Level Calibration





TIC: 1223-002.D

(14) tert-Butyl Alcohol (T)

4.58min 1.79ug/L

response 1517

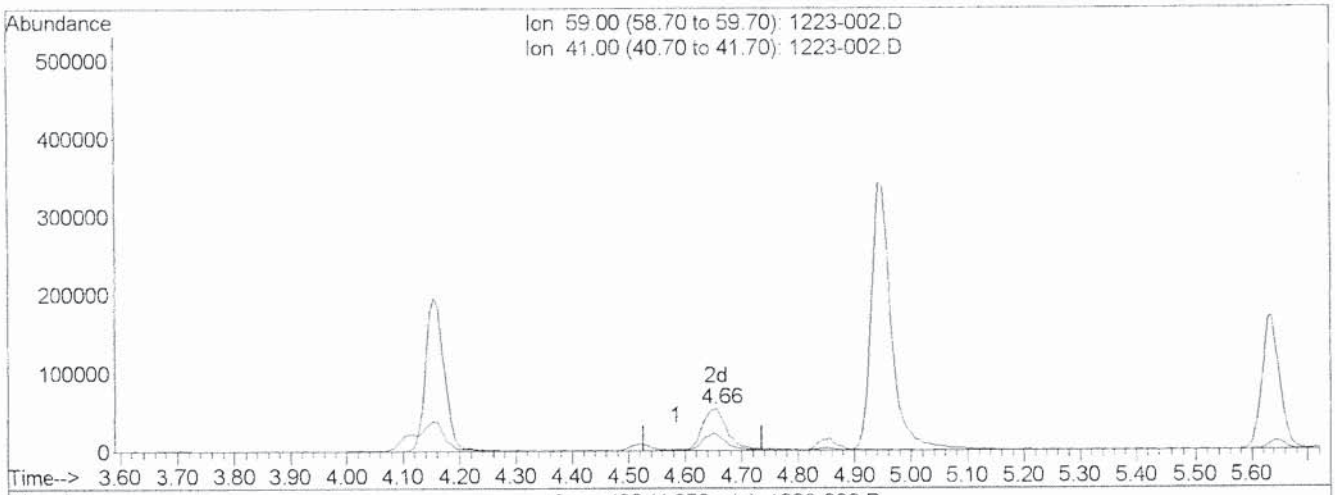
Ion	Exp%	Act%
59.00	100	100
41.00	33.10	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

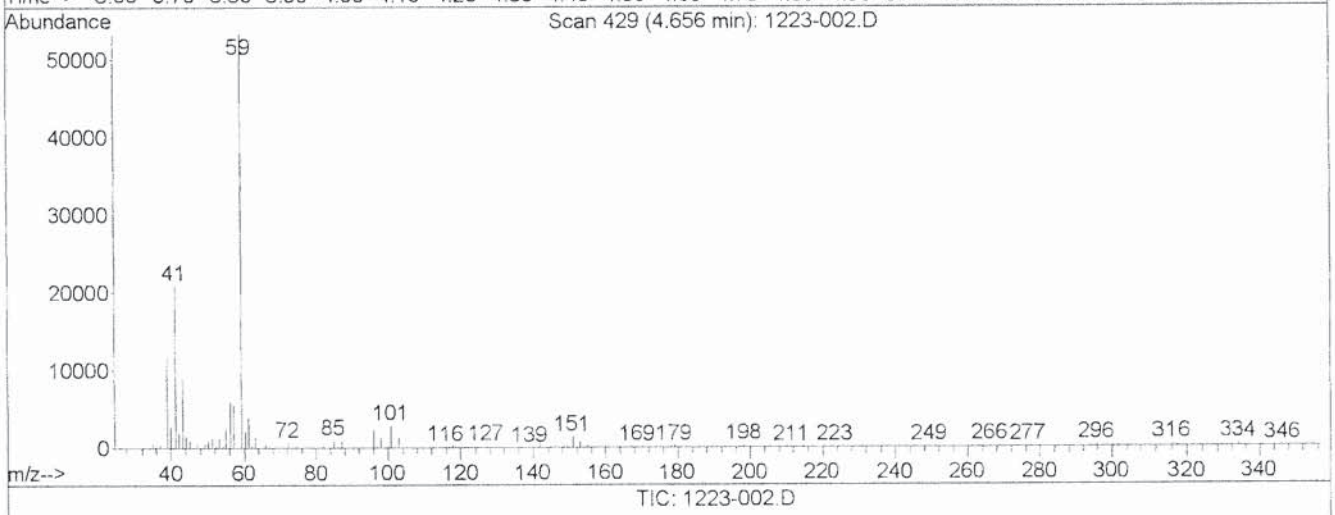
SGA

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141223\1223-002.D Vial: 2
Acq On : 23 Dec 2014 12:30 pm Operator: SGA
Sample : CCV Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 23 13:04 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Multiple Level Calibration





TIC: 1223-002.D

(14) tert-Butyl Alcohol (T)

4.66min 193.59ug/L m

response 163675

Ion	Exp%	Act%
59.00	100	100
41.00	33.10	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

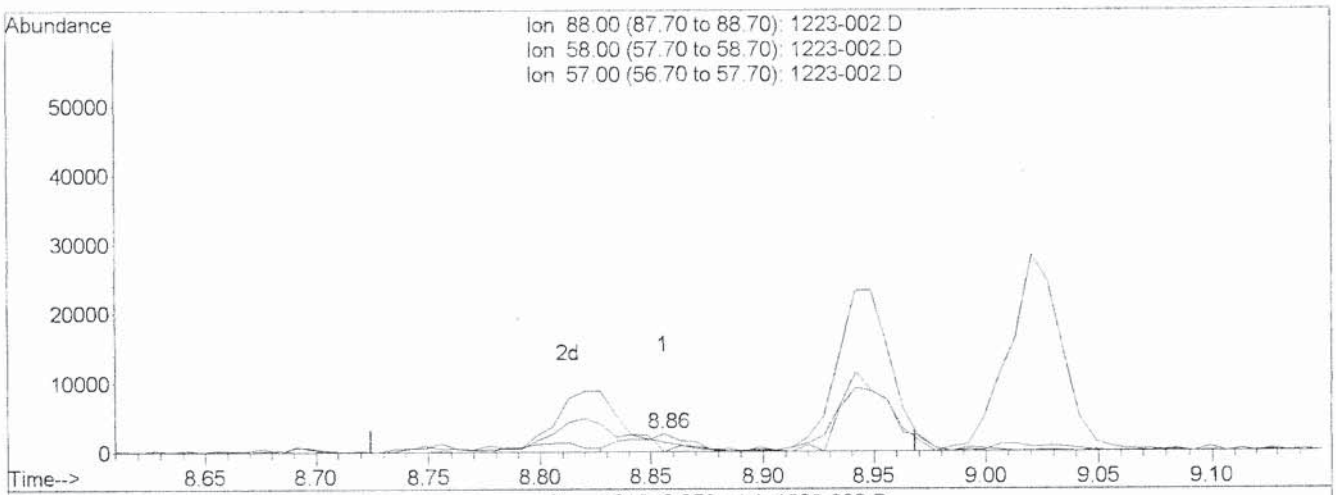
MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
(3.) PEAK NOT FOUND
4. OTHER
ANALYST
DATE 12-23-14

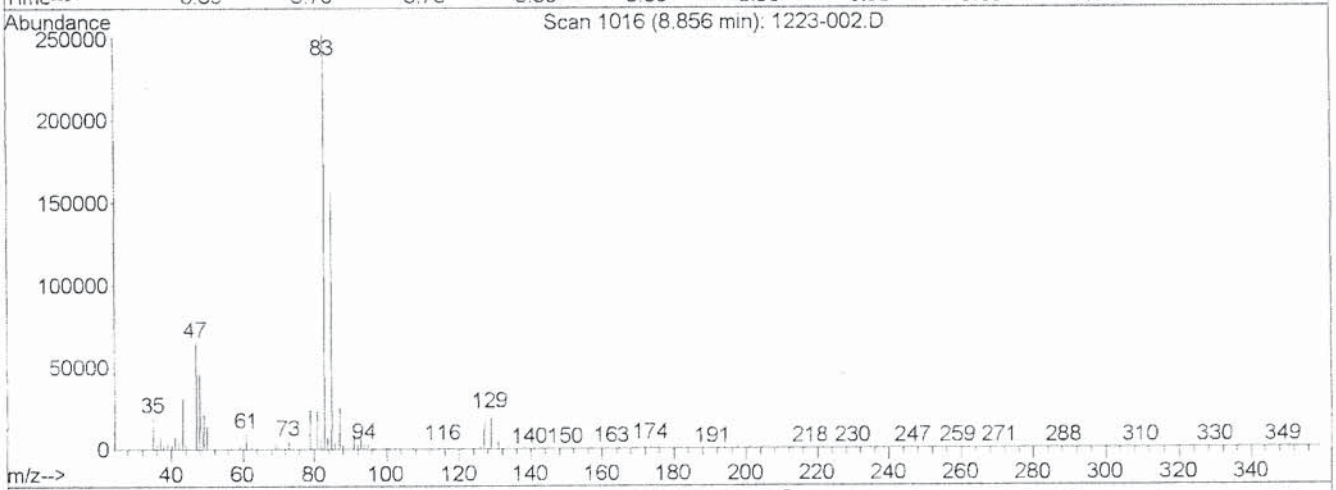
1223-002.D 141130W.M Tue Dec 23 13:07:35 2014

Quantitation Report (Qedit)

Data File : C:\HPCHEM\1\DATA\52141223\1223-002.D Vial: 2
Acq On : 23 Dec 2014 12:30 pm Operator: SGA
Sample : CCV Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 23 12:47 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Multiple Level Calibration





TIC: 1223-002.D

(55) 1,4-Dioxane (T)

8.86min 36.79ug/L

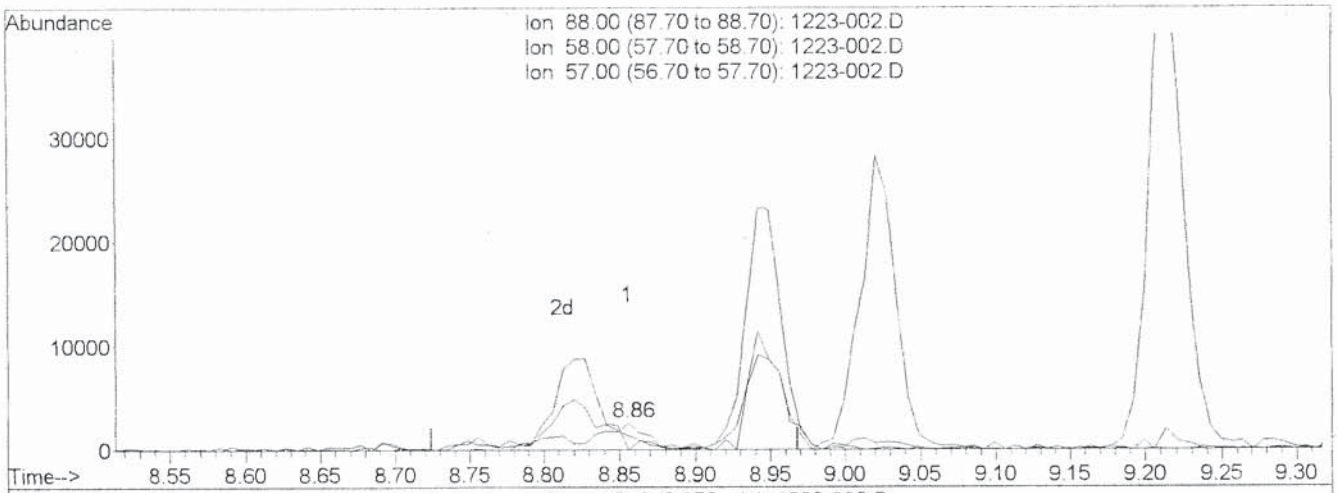
response 4674

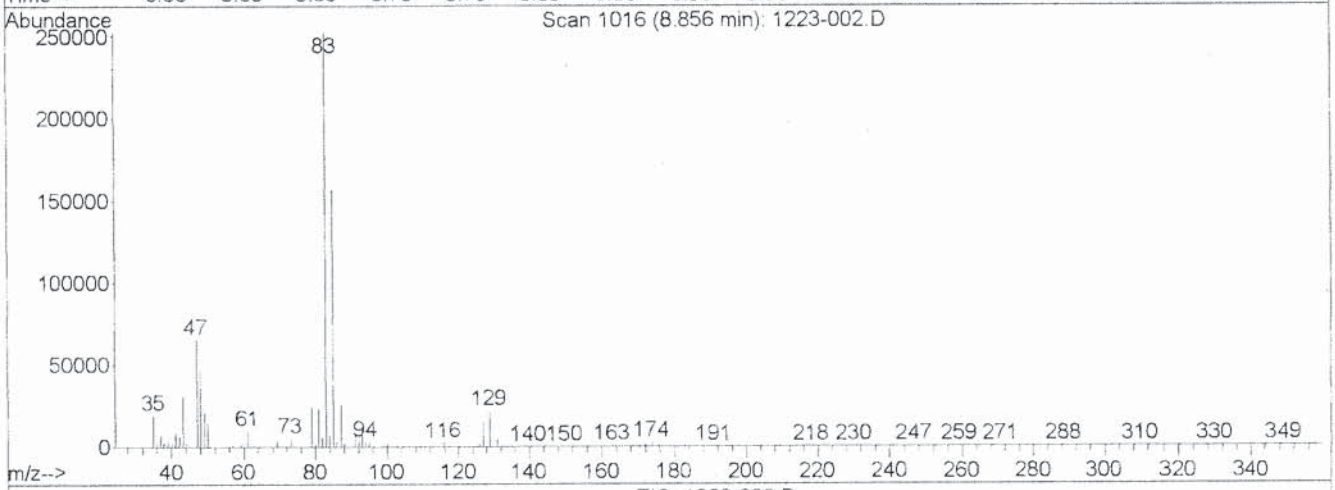
Ion	Exp%	Act%
88.00	100	100
58.00	78.40	0.00#
57.00	39.40	0.00#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS52\DATA\MS52-141223\1223-002.D Vial: 2
Acq On : 23 Dec 2014 12:30 pm Operator: SGA
Sample : CCV Inst : ms52
Misc : 8260B Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Dec 23 13:04 2014 Quant Results File: temp.res

Method : C:\HPCHEM\1\METHODS\141130W.M (RTE Integrator)
Title : 8260
Last Update : Mon Dec 22 16:41:39 2014
Response via : Multiple Level Calibration





TIC: 1223-002.D

(55) 1,4-Dioxane (T)

8.86min 57.82ug/L m

response 7345

Ion	Exp%	Act%
88.00	100	100
58.00	78.40	0.00#
57.00	39.40	0.00#
0.00	0.00	0.00

After

MANUAL EDIT CODES
1. WRONG PEAK SELECTED
2. POOR INTEGRATION
3. PEAK NOT FOUND
4. OTHER
ANALYST
DATE 12-23-14

Organic Analysis:
Volatile Organic Compounds by GC/MS

Validation Package

Sample Prep and Screen Data

p:\Stealth\Crystal.rpt\DividerF.rpt

Preparation Information

Group ID:	JWG1500320	**Prep Method:**	EPA 5030B	**Prep Date:**	12/23/14 12:03
Department:	VolatileOrganic				

Lab Code	Client ID	Product	Matrix	Amt. Ext.	Final Vol.
J1409737-001	39A-21ST-MW00119S-017.5	8260B	WATER	5ml	5ml
J1409737-002	39A-21ST-MW0021S-017.5-	8260B	WATER	5ml	5ml
J1409737-003	39A-21ST-MW0018S-015.5-	8260B	WATER	5ml	5ml
J1409737-004	39A-21ST-MW0017S-016.5-	8260B	WATER	5ml	5ml
J1409737-005	39A-21ST-MW0017I-032.5-2	8260B	WATER	5ml	5ml
J1409737-006	39A-21ST-MW0031I-025.5-2	8260B	WATER	5ml	5ml
J1409737-007	39A-21ST-MW0032I-025.5-2	8260B	WATER	5ml	5ml
J1409737-008	39A-21ST-MW0023S-017.5-	8260B	WATER	5ml	5ml
J1409737-009	39A-21ST-MW0023I-032.5-2	8260B	WATER	5ml	5ml
J1409737-010	39A-21ST-TB-121214	8260B	WATER	5ml	5ml
J1409737-011	39A-21ST-MW0014I-024.5-2	8260B	WATER	5ml	5ml
J1409737-012	39A-21ST-MW0015I-038.5-2	8260B	WATER	5ml	5ml
J1409737-013	39A-21ST-MW0030I-02.5-20	8260B	WATER	5ml	5ml
J1409737-014	39A-21ST-MW0025S-014.5-	8260B	WATER	5ml	5ml
J1409737-015	39A-21ST-MW0026S-017.5-	8260B	WATER	5ml	5ml
J1409737-016	39A-21ST-MW0028I-024.5-2	8260B	WATER	5ml	5ml
J1409737-017	39A-DBA-IW0003S-012.0-20	8260B	WATER	5ml	5ml
J1409737-018	39A-DBA-IW0003I-035.5-20	8260B	WATER	5ml	5ml
JWG1500320-1	Lab Control Sample	8260B	WATER	5ml	5ml
JWG1500320-2	Duplicate Lab Control Sampl	8260B	WATER	5ml	5ml
JWG1500320-3	Method Blank	8260B	WATER	5ml	5ml

Lab Code	Prep Event ID	Surrogate Solution ID	Amount Added	Spike Solution ID	Amount Added	Witness
J1409737-001	281337	72142	5uL			SAllen
J1409737-002	281338	72142	5uL			SAllen
J1409737-003	281339	72142	5uL			SAllen
J1409737-004	281340	72142	5uL			SAllen
J1409737-005	281341	72142	5uL			SAllen
J1409737-006	281342	72142	5uL			SAllen
J1409737-007	281343	72142	5uL			SAllen
J1409737-008	281344	72142	5uL			SAllen
J1409737-009	281345	72142	5uL			SAllen
J1409737-010	281346	72142	5uL			SAllen
J1409737-011	281347	72142	5uL			SAllen
J1409737-012	281348	72142	5uL			SAllen
J1409737-013	281349	72142	5uL			SAllen

Comments:

Started By: MMSulliv Assisted By: Training Yes No

Completed By: MMSulliv Assisted By: Yes No

Reviewed By: Date: Storage:

Chain of Custody

Relinquished By: Date: Extracts Examined

Received By: Date: Yes No

376

Group ID:	JWG1500320	**Prep Method:**	EPA 5030B	**Prep Date:**	12/23/14 12:03
Department:	VolatileOrganic				

Lab Code	Prep Event ID	Surrogate Solution ID	Amount Added	Spike Solution ID	Amount Added	Witness
J1409737-014	281350	72142	5uL			SAllen
J1409737-015	281351	72142	5uL			SAllen
J1409737-016	281352	72142	5uL			SAllen
J1409737-017	281353	72142	5uL			SAllen
J1409737-018	281336	72142	5uL			SAllen
JWG1500320-1	281333	72142	5uL	76595/76586/765	25uL	SAllen
JWG1500320-2	281334	72142	5uL	76595/76586/765	25uL	SAllen
JWG1500320-3	281335	72142	5uL			SAllen

Comments:

Started By: MMSulliv Assisted By: Training Yes No

Completed By: MMSulliv Assisted By: Yes No

Reviewed By: Date: Storage:

Chain of Custody

Relinquished By: Date: Extracts Examined

Received By: Date: 377 No

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www.alsglobal.com

LABORATORY REPORT

February 12, 2015

Chris Pike
Tetra Tech NUS, Inc.
Foster Plaza 7 661 Andersen Drive
Pittsburgh, PA 15220

RE: LC39A GW Interim Measure / 112G06925

Dear Chris:

Enclosed are the results of the samples submitted to our laboratory on January 27, 2015. For your reference, these analyses have been assigned our service request number P1500308.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental



Kate Aguilera
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: Tetra Tech NUS, Inc. Service Request No: P1500308
Project: LC39A GW Interim Measure / 112G06925

CASE NARRATIVE

The samples were received intact under chain of custody on January 27, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is not included on the laboratory's AIHA-LAP scope of accreditation. Any analytes flagged with an X are not included on the laboratory's NELAP or DoD-ELAP scope of accreditation.

Manual integrations were performed on the following sample(s) and analyte(s). Refer to the raw data for additional information.

Sample Identification(s)	Analyte(s)
P1500308-001-003	Acetone

The Summa canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	838341
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-14-5
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272014-4
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Tetra Tech NUS, Inc. Service Request: P1500308

Project ID: LC39A GW Interim Measure / 112G06925

Date Received: 1/27/2015

Time Received: 10:18

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pfl (psig)	TO-15 - VOC Cans
LC39A-AIR-Baseline-20150124	P1500308-001	Air	1/24/2015	16:45	AC01466	-2.99	3.69	X
LC39A-AIR-Startup D1-20150125	P1500308-002	Air	1/25/2015	14:55	AC01322	-0.68	3.70	X

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: F1500308

Company Name & Address (Reporting Information): Tetra Tech

Project Name: LC39A GW Interim Measure

Project Number: 112G06925

Project Manager: Chris Pike

P.O. # / Billing Information

Phone: 412-921-7090

Fax:

Email Address for Result Reporting: Chris.Pike@tetratech.com

Sampler (Print & Sign): Christopher Hook Christopher A. Hook

ALS Contact:

Analysis Method: TO-15 Client List

Comments e.g. Actual Preservative or specific instructions

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-15 Client List		Comments
LC39A-AIR-Baseline-20140624	1501240124 ①	11/24/2015	0845 1645	LC FCA AC01466	FCA00472	-28.5	-7	6L	✓		
LC39A-AIR-Startup DI-20140625	1501250125 ②	11/25/2015	0755 1455	AC01322	FCA00968	>-30	-3	6L	✓		
~~LC39A-AIR-Startup 4hr-20140625~~	③	12/2/2014	~~0811~~	AS00781	FCA00268	>-30		6L	✓		

5 of 165

Report Tier Levels - please select

Tier I - Results (Default in not specified) _____ Tier III (Results + QC & Calibration Summaries) _____

Tier II (Results + QC Summaries _____ Tier IV (Date Validation Package) 10% Surcharge _____

EDD required YES / No

Type: _____ Units: _____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date: 11/26/15	Time: 1730	Received by: (Signature) FEDEX	Date: 11/26/15	Time: 1730		
Relinquished by: (Signature) FED EX	Date:	Time:	Received by: (Signature)	Date: 11/27/15	Time: 1018	Cooler / Blank Temperature _____ °C	

ALS Environmental
Sample Acceptance Check Form

Client: Tetra Tech NUS, Inc. Work order: P1500308

Project: LC39A GW Interim Measure / 112G06925

Sample(s) received on: 1/27/15 Date opened: 1/27/15 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by ALS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1500308-001.01	6.0 L Ambient Can					
P1500308-002.01	6.0 L Ambient Can					

Explain any discrepancies: (include lab sample ID numbers):

Sample LC39A-AIR-Startup D2-20140126 was not received.

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Baseline-20150124**
Client Project ID: **LC39A GW Interim Measure / 112G06925**

ALS Project ID: P1500308
ALS Sample ID: P1500308-001

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01466

Date Collected: 1/24/15
Date Received: 1/27/15
Date Analyzed: 2/3/15
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -2.99 Final Pressure (psig): 3.69

Canister Dilution Factor: 1.57

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	**2.3**	0.79	0.27	**0.47**	0.16	0.054	
74-87-3	Chloromethane	**0.49**	0.79	0.24	**0.24**	0.38	0.11	**J**
75-01-4	Vinyl Chloride	ND	0.79	0.27	ND	0.31	0.10	
74-83-9	Bromomethane	ND	0.79	0.30	ND	0.20	0.077	
75-00-3	Chloroethane	ND	0.79	0.27	ND	0.30	0.10	
67-64-1	Acetone	**6.9**	7.9	1.2	**2.9**	3.3	0.51	**J**
75-69-4	Trichlorofluoromethane	**1.3**	0.79	0.27	**0.22**	0.14	0.048	
75-35-4	1,1-Dichloroethene	ND	0.79	0.27	ND	0.20	0.067	
75-09-2	Methylene Chloride	**0.39**	0.79	0.27	**0.11**	0.23	0.077	**J**
76-13-1	Trichlorotrifluoroethane	**0.47**	0.79	0.27	**0.061**	0.10	0.035	**J**
75-15-0	Carbon Disulfide	ND	7.9	0.24	ND	2.5	0.076	
156-60-5	trans-1,2-Dichloroethene	ND	0.79	0.30	ND	0.20	0.075	
75-34-3	1,1-Dichloroethane	ND	0.79	0.25	ND	0.19	0.062	
1634-04-4	Methyl tert-Butyl Ether	ND	0.79	0.27	ND	0.22	0.074	
78-93-3	2-Butanone (MEK)	**1.2**	7.9	0.33	**0.41**	2.7	0.11	**J**
156-59-2	cis-1,2-Dichloroethene	ND	0.79	0.25	ND	0.20	0.063	
67-66-3	Chloroform	ND	0.79	0.27	ND	0.16	0.055	
107-06-2	1,2-Dichloroethane	ND	0.79	0.25	ND	0.19	0.062	
71-55-6	1,1,1-Trichloroethane	ND	0.79	0.27	ND	0.14	0.049	
71-43-2	Benzene	**0.41**	0.79	0.25	**0.13**	0.25	0.079	**J**
56-23-5	Carbon Tetrachloride	**0.47**	0.79	0.24	**0.075**	0.12	0.037	**J**
110-82-7	Cyclohexane	ND	1.6	0.46	ND	0.46	0.13	
78-87-5	1,2-Dichloropropane	ND	0.79	0.25	ND	0.17	0.054	
75-27-4	Bromodichloromethane	ND	0.79	0.24	ND	0.12	0.035	
79-01-6	Trichloroethene	ND	0.79	0.22	ND	0.15	0.041	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Baseline-20150124** ALS Project ID: P1500308
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P1500308-001

Test Code: EPA TO-15 Date Collected: 1/24/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 1/27/15
Analyst: Lusine Hakobyan Date Analyzed: 2/3/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01466

Initial Pressure (psig): -2.99 Final Pressure (psig): 3.69

Canister Dilution Factor: 1.57

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	0.79	0.22	ND	0.17	0.048	
108-10-1	4-Methyl-2-pentanone	ND	0.79	0.25	ND	0.19	0.061	
10061-02-6	trans-1,3-Dichloropropene	ND	0.79	0.25	ND	0.17	0.055	
79-00-5	1,1,2-Trichloroethane	ND	0.79	0.25	ND	0.14	0.046	
108-88-3	Toluene	**0.57**	0.79	0.27	**0.15**	0.21	0.071	**J**
591-78-6	2-Hexanone	ND	0.79	0.25	ND	0.19	0.061	
124-48-1	Dibromochloromethane	ND	0.79	0.25	ND	0.092	0.029	
106-93-4	1,2-Dibromoethane	ND	0.79	0.25	ND	0.10	0.033	
127-18-4	Tetrachloroethene	ND	0.79	0.22	ND	0.12	0.032	
108-90-7	Chlorobenzene	ND	0.79	0.25	ND	0.17	0.055	
100-41-4	Ethylbenzene	ND	0.79	0.25	ND	0.18	0.058	
179601-23-1	m,p-Xylenes	ND	1.6	0.47	ND	0.36	0.11	
75-25-2	Bromoform	ND	0.79	0.24	ND	0.076	0.023	
100-42-5	Styrene	ND	0.79	0.24	ND	0.18	0.055	
95-47-6	o-Xylene	ND	0.79	0.24	ND	0.18	0.054	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.79	0.24	ND	0.11	0.034	
98-82-8	Cumene	ND	0.79	0.24	ND	0.16	0.048	
541-73-1	1,3-Dichlorobenzene	ND	0.79	0.24	ND	0.13	0.039	
106-46-7	1,4-Dichlorobenzene	ND	0.79	0.22	ND	0.13	0.037	
95-50-1	1,2-Dichlorobenzene	ND	0.79	0.24	ND	0.13	0.039	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.79	0.16	ND	0.081	0.016	
120-82-1	1,2,4-Trichlorobenzene	ND	0.79	0.25	ND	0.11	0.034	
79-20-9	Methyl Acetate	ND	0.79	0.38	ND	0.26	0.12	**X**
108-87-2	Methylcyclohexane	ND	0.79	0.41	ND	0.20	0.10	**X**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
X = See case narrative.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D1-20150125**
Client Project ID: **LC39A GW Interim Measure / 112G06925**

ALS Project ID: P1500308
ALS Sample ID: P1500308-002

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01322

Date Collected: 1/25/15
Date Received: 1/27/15
Date Analyzed: 2/3/15
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -0.68 Final Pressure (psig): 3.70

Canister Dilution Factor: 1.31

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	**2.3**	0.66	0.22	**0.46**	0.13	0.045	
74-87-3	Chloromethane	**0.56**	0.66	0.20	**0.27**	0.32	0.095	**J**
75-01-4	Vinyl Chloride	ND	0.66	0.22	ND	0.26	0.087	
74-83-9	Bromomethane	ND	0.66	0.25	ND	0.17	0.064	
75-00-3	Chloroethane	ND	0.66	0.22	ND	0.25	0.084	
67-64-1	Acetone	**4.9**	6.6	1.0	**2.1**	2.8	0.42	**J**
75-69-4	Trichlorofluoromethane	**1.3**	0.66	0.22	**0.23**	0.12	0.040	
75-35-4	1,1-Dichloroethene	ND	0.66	0.22	ND	0.17	0.056	
75-09-2	Methylene Chloride	**0.38**	0.66	0.22	**0.11**	0.19	0.064	**J**
76-13-1	Trichlorotrifluoroethane	**3.8**	0.66	0.22	**0.49**	0.086	0.029	
75-15-0	Carbon Disulfide	ND	6.6	0.20	ND	2.1	0.063	
156-60-5	trans-1,2-Dichloroethene	ND	0.66	0.25	ND	0.17	0.063	
75-34-3	1,1-Dichloroethane	ND	0.66	0.21	ND	0.16	0.052	
1634-04-4	Methyl tert-Butyl Ether	ND	0.66	0.22	ND	0.18	0.062	
78-93-3	2-Butanone (MEK)	**1.2**	6.6	0.28	**0.40**	2.2	0.093	**J**
156-59-2	cis-1,2-Dichloroethene	ND	0.66	0.21	ND	0.17	0.053	
67-66-3	Chloroform	ND	0.66	0.22	ND	0.13	0.046	
107-06-2	1,2-Dichloroethane	ND	0.66	0.21	ND	0.16	0.052	
71-55-6	1,1,1-Trichloroethane	ND	0.66	0.22	ND	0.12	0.041	
71-43-2	Benzene	**0.31**	0.66	0.21	**0.097**	0.21	0.066	**J**
56-23-5	Carbon Tetrachloride	**0.41**	0.66	0.20	**0.065**	0.10	0.031	**J**
110-82-7	Cyclohexane	ND	1.3	0.38	ND	0.38	0.11	
78-87-5	1,2-Dichloropropane	ND	0.66	0.21	ND	0.14	0.045	
75-27-4	Bromodichloromethane	ND	0.66	0.20	ND	0.098	0.029	
79-01-6	Trichloroethene	ND	0.66	0.18	ND	0.12	0.034	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D1-20150125** ALS Project ID: P1500308
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P1500308-002

Test Code: EPA TO-15 Date Collected: 1/25/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 1/27/15
Analyst: Lusine Hakobyan Date Analyzed: 2/3/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01322

Initial Pressure (psig): -0.68 Final Pressure (psig): 3.70

Canister Dilution Factor: 1.31

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	0.66	0.18	ND	0.14	0.040	
108-10-1	4-Methyl-2-pentanone	ND	0.66	0.21	ND	0.16	0.051	
10061-02-6	trans-1,3-Dichloropropene	ND	0.66	0.21	ND	0.14	0.046	
79-00-5	1,1,2-Trichloroethane	ND	0.66	0.21	ND	0.12	0.038	
108-88-3	Toluene	**0.49**	0.66	0.22	**0.13**	0.17	0.059	**J**
591-78-6	2-Hexanone	**0.29**	0.66	0.21	**0.071**	0.16	0.051	**J**
124-48-1	Dibromochloromethane	ND	0.66	0.21	ND	0.077	0.025	
106-93-4	1,2-Dibromoethane	ND	0.66	0.21	ND	0.085	0.027	
127-18-4	Tetrachloroethene	ND	0.66	0.18	ND	0.097	0.027	
108-90-7	Chlorobenzene	ND	0.66	0.21	ND	0.14	0.046	
100-41-4	Ethylbenzene	ND	0.66	0.21	ND	0.15	0.048	
179601-23-1	m,p-Xylenes	ND	1.3	0.39	ND	0.30	0.091	
75-25-2	Bromoform	ND	0.66	0.20	ND	0.063	0.019	
100-42-5	Styrene	ND	0.66	0.20	ND	0.15	0.046	
95-47-6	o-Xylene	ND	0.66	0.20	ND	0.15	0.045	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.66	0.20	ND	0.095	0.029	
98-82-8	Cumene	ND	0.66	0.20	ND	0.13	0.040	
541-73-1	1,3-Dichlorobenzene	ND	0.66	0.20	ND	0.11	0.033	
106-46-7	1,4-Dichlorobenzene	ND	0.66	0.18	ND	0.11	0.031	
95-50-1	1,2-Dichlorobenzene	ND	0.66	0.20	ND	0.11	0.033	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.66	0.13	ND	0.068	0.013	
120-82-1	1,2,4-Trichlorobenzene	ND	0.66	0.21	ND	0.088	0.028	
79-20-9	Methyl Acetate	ND	0.66	0.31	ND	0.22	0.10	**X**
108-87-2	Methylcyclohexane	ND	0.66	0.34	ND	0.16	0.085	**X**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
X = See case narrative.

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P1500308
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P150203-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 2/3/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	0.17	ND	0.10	0.034	
74-87-3	Chloromethane	ND	0.50	0.15	ND	0.24	0.073	
75-01-4	Vinyl Chloride	ND	0.50	0.17	ND	0.20	0.067	
74-83-9	Bromomethane	ND	0.50	0.19	ND	0.13	0.049	
75-00-3	Chloroethane	ND	0.50	0.17	ND	0.19	0.064	
67-64-1	Acetone	ND	5.0	0.77	ND	2.1	0.32	
75-69-4	Trichlorofluoromethane	ND	0.50	0.17	ND	0.089	0.030	
75-35-4	1,1-Dichloroethene	ND	0.50	0.17	ND	0.13	0.043	
75-09-2	Methylene Chloride	ND	0.50	0.17	ND	0.14	0.049	
76-13-1	Trichlorotrifluoroethane	ND	0.50	0.17	ND	0.065	0.022	
75-15-0	Carbon Disulfide	ND	5.0	0.15	ND	1.6	0.048	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
75-34-3	1,1-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	0.17	ND	0.14	0.047	
78-93-3	2-Butanone (MEK)	ND	5.0	0.21	ND	1.7	0.071	
156-59-2	cis-1,2-Dichloroethene	ND	0.50	0.16	ND	0.13	0.040	
67-66-3	Chloroform	ND	0.50	0.17	ND	0.10	0.035	
107-06-2	1,2-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.17	ND	0.092	0.031	
71-43-2	Benzene	ND	0.50	0.16	ND	0.16	0.050	
56-23-5	Carbon Tetrachloride	ND	0.50	0.15	ND	0.080	0.024	
110-82-7	Cyclohexane	ND	1.0	0.29	ND	0.29	0.084	
78-87-5	1,2-Dichloropropane	ND	0.50	0.16	ND	0.11	0.035	
75-27-4	Bromodichloromethane	ND	0.50	0.15	ND	0.075	0.022	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P1500308
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P150203-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 2/3/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.14	ND	0.11	0.031	
108-10-1	4-Methyl-2-pentanone	ND	0.50	0.16	ND	0.12	0.039	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.16	ND	0.11	0.035	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.16	ND	0.092	0.029	
108-88-3	Toluene	ND	0.50	0.17	ND	0.13	0.045	
591-78-6	2-Hexanone	ND	0.50	0.16	ND	0.12	0.039	
124-48-1	Dibromochloromethane	ND	0.50	0.16	ND	0.059	0.019	
106-93-4	1,2-Dibromoethane	ND	0.50	0.16	ND	0.065	0.021	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
108-90-7	Chlorobenzene	ND	0.50	0.16	ND	0.11	0.035	
100-41-4	Ethylbenzene	ND	0.50	0.16	ND	0.12	0.037	
179601-23-1	m,p-Xylenes	ND	1.0	0.30	ND	0.23	0.069	
75-25-2	Bromoform	ND	0.50	0.15	ND	0.048	0.015	
100-42-5	Styrene	ND	0.50	0.15	ND	0.12	0.035	
95-47-6	o-Xylene	ND	0.50	0.15	ND	0.12	0.035	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.15	ND	0.073	0.022	
98-82-8	Cumene	ND	0.50	0.15	ND	0.10	0.031	
541-73-1	1,3-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
106-46-7	1,4-Dichlorobenzene	ND	0.50	0.14	ND	0.083	0.023	
95-50-1	1,2-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	0.099	ND	0.052	0.010	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	0.16	ND	0.067	0.022	
79-20-9	Methyl Acetate	ND	0.50	0.24	ND	0.17	0.079	**X**
108-87-2	Methylcyclohexane	ND	0.50	0.26	ND	0.12	0.065	**X**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
X = See case narrative.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **Tetra Tech NUS, Inc.**
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Project ID: P1500308

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 1/24 - 1/25/15
Analyst: Lusine Hakobyan Date(s) Received: 1/27/15
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 2/3/15
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P150203-MB	**105**	**99**	**97**	70-130	
Lab Control Sample	P150203-LCS	**101**	**96**	**99**	70-130	
LC39A-AIR-Baseline-20150124	P1500308-001	**102**	**96**	**104**	70-130	
LC39A-AIR-Startup D1-20150125	P1500308-002	**106**	**100**	**105**	70-130	
LC39A-AIR-Startup D1-20150125	P1500308-002DUP	**104**	**95**	**105**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1500308
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P150203-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 2/3/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	204	**207**	**101**	66-117	
74-87-3	Chloromethane	198	**197**	**99**	51-133	
75-01-4	Vinyl Chloride	202	**205**	**101**	61-127	
74-83-9	Bromomethane	202	**223**	**110**	62-114	
75-00-3	Chloroethane	202	**209**	**103**	64-122	
67-64-1	Acetone	1,080	**1060**	**98**	60-113	
75-69-4	Trichlorofluoromethane	198	**222**	**112**	64-112	
75-35-4	1,1-Dichloroethene	214	**218**	**102**	70-114	
75-09-2	Methylene Chloride	216	**217**	**100**	63-103	
76-13-1	Trichlorotrifluoroethane	216	**209**	**97**	69-116	
75-15-0	Carbon Disulfide	196	**219**	**112**	66-118	
156-60-5	trans-1,2-Dichloroethene	212	**230**	**108**	69-123	
75-34-3	1,1-Dichloroethane	208	**213**	**102**	65-118	
1634-04-4	Methyl tert-Butyl Ether	212	**219**	**103**	57-125	
78-93-3	2-Butanone (MEK)	216	**213**	**99**	63-121	
156-59-2	cis-1,2-Dichloroethene	214	**225**	**105**	69-119	
67-66-3	Chloroform	216	**220**	**102**	68-111	
107-06-2	1,2-Dichloroethane	210	**216**	**103**	67-117	
71-55-6	1,1,1-Trichloroethane	208	**210**	**101**	74-116	
71-43-2	Benzene	220	**208**	**95**	61-109	
56-23-5	Carbon Tetrachloride	214	**234**	**109**	76-120	
110-82-7	Cyclohexane	422	**424**	**100**	72-115	
78-87-5	1,2-Dichloropropane	212	**216**	**102**	67-119	
75-27-4	Bromodichloromethane	216	**221**	**102**	78-124	
79-01-6	Trichloroethene	208	**216**	**104**	69-115	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1500308
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P150203-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 2/3/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	226	**241**	**107**	77-124	
108-10-1	4-Methyl-2-pentanone	218	**235**	**108**	66-134	
10061-02-6	trans-1,3-Dichloropropene	216	**252**	**117**	80-130	
79-00-5	1,1,2-Trichloroethane	212	**222**	**105**	75-119	
108-88-3	Toluene	212	**192**	**91**	68-114	
591-78-6	2-Hexanone	222	**220**	**99**	60-136	
124-48-1	Dibromochloromethane	220	**240**	**109**	75-132	
106-93-4	1,2-Dibromoethane	216	**232**	**107**	72-122	
127-18-4	Tetrachloroethene	198	**191**	**96**	67-120	
108-90-7	Chlorobenzene	216	**214**	**99**	69-114	
100-41-4	Ethylbenzene	212	**220**	**104**	71-117	
179601-23-1	m,p-Xylenes	420	**426**	**101**	71-118	
75-25-2	Bromoform	216	**259**	**120**	76-149	
100-42-5	Styrene	218	**229**	**105**	71-128	
95-47-6	o-Xylene	206	**208**	**101**	72-118	
79-34-5	1,1,2,2-Tetrachloroethane	202	**210**	**104**	73-124	
98-82-8	Cumene	204	**204**	**100**	71-118	
541-73-1	1,3-Dichlorobenzene	218	**212**	**97**	67-121	
106-46-7	1,4-Dichlorobenzene	212	**194**	**92**	68-121	
95-50-1	1,2-Dichlorobenzene	214	**207**	**97**	68-121	
96-12-8	1,2-Dibromo-3-chloropropane	206	**234**	**114**	73-145	
120-82-1	1,2,4-Trichlorobenzene	210	**227**	**108**	60-135	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D1-20150125** ALS Project ID: P1500308
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P1500308-002DUP

Test Code: EPA TO-15 Date Collected: 1/25/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 1/27/15
Analyst: Lusine Hakobyan Date Analyzed: 2/3/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01322

Initial Pressure (psig): -0.68 Final Pressure (psig): 3.70

Canister Dilution Factor: 1.31

Compound	Sample Result		Duplicate Sample Result		Average	% RPD	RPD Limit	Data Qualifier
	µg/m³	ppbV	µg/m³	ppbV	µg/m³			
Dichlorodifluoromethane (CFC 12)	2.28	0.462	2.29	0.464	2.285	**0.4**	25	
Chloromethane	0.559	0.271	0.424	0.206	0.4915	**27**	25	**J, R**
Vinyl Chloride	ND	ND	ND	ND	-	-	25	
Bromomethane	ND	ND	ND	ND	-	-	25	
Chloroethane	ND	ND	ND	ND	-	-	25	
Acetone	4.92	2.07	5.24	2.21	5.08	**6**	25	**J**
Trichlorofluoromethane	1.29	0.230	1.30	0.232	1.295	**0.8**	25	
1,1-Dichloroethene	ND	ND	ND	ND	-	-	25	
Methylene Chloride	0.377	0.109	0.381	0.110	0.379	**1**	25	**J**
Trichlorotrifluoroethane	3.77	0.493	3.41	0.445	3.59	**10**	25	
Carbon Disulfide	ND	ND	ND	ND	-	-	25	
trans-1,2-Dichloroethene	ND	ND	ND	ND	-	-	25	
1,1-Dichloroethane	ND	ND	ND	ND	-	-	25	
Methyl tert-Butyl Ether	ND	ND	ND	ND	-	-	25	
2-Butanone (MEK)	1.19	0.405	1.15	0.390	1.17	**3**	25	**J**
cis-1,2-Dichloroethene	ND	ND	ND	ND	-	-	25	
Chloroform	ND	ND	ND	ND	-	-	25	
1,2-Dichloroethane	ND	ND	ND	ND	-	-	25	
1,1,1-Trichloroethane	ND	ND	ND	ND	-	-	25	
Benzene	0.309	0.0968	0.320	0.100	0.3145	**3**	25	**J**
Carbon Tetrachloride	0.407	0.0648	0.403	0.0642	0.405	**1**	25	**J**
Cyclohexane	ND	ND	ND	ND	-	-	25	
1,2-Dichloropropane	ND	ND	ND	ND	-	-	25	
Bromodichloromethane	ND	ND	ND	ND	-	-	25	
Trichloroethene	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
R = Duplicate precision not met.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D1-20150125** ALS Project ID: P1500308
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P1500308-002DUP

Test Code: EPA TO-15 Date Collected: 1/25/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 1/27/15
Analyst: Lusine Hakobyan Date Analyzed: 2/3/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01322

Initial Pressure (psig): -0.68 Final Pressure (psig): 3.70

Canister Dilution Factor: 1.31

Compound	Sample Result µg/m³	Sample Result ppbV	Duplicate Sample Result µg/m³	Duplicate Sample Result ppbV	Average µg/m³	% RPD	RPD Limit	Data Qualifier
cis-1,3-Dichloropropene	ND	ND	ND	ND	-	-	25	
4-Methyl-2-pentanone	ND	ND	ND	ND	-	-	25	
trans-1,3-Dichloropropene	ND	ND	ND	ND	-	-	25	
1,1,2-Trichloroethane	ND	ND	ND	ND	-	-	25	
Toluene	0.493	0.131	0.472	0.125	0.4825	**4**	25	**J**
2-Hexanone	0.292	0.0713	0.271	0.0662	0.2815	**7**	25	**J**
Dibromochloromethane	ND	ND	ND	ND	-	-	25	
1,2-Dibromoethane	ND	ND	ND	ND	-	-	25	
Tetrachloroethene	ND	ND	ND	ND	-	-	25	
Chlorobenzene	ND	ND	ND	ND	-	-	25	
Ethylbenzene	ND	ND	ND	ND	-	-	25	
m,p-Xylenes	ND	ND	ND	ND	-	-	25	
Bromoform	ND	ND	ND	ND	-	-	25	
Styrene	ND	ND	ND	ND	-	-	25	
o-Xylene	ND	ND	ND	ND	-	-	25	
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	-	-	25	
Cumene	ND	ND	ND	ND	-	-	25	
1,3-Dichlorobenzene	ND	ND	ND	ND	-	-	25	
1,4-Dichlorobenzene	ND	ND	ND	ND	-	-	25	
1,2-Dichlorobenzene	ND	ND	ND	ND	-	-	25	
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	-	-	25	
1,2,4-Trichlorobenzene	ND	ND	ND	ND	-	-	25	
Methyl Acetate	ND	ND	ND	ND	-	-	25	**X**
Methylcyclohexane	ND	ND	ND	ND	-	-	25	**X**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
X = See case narrative.

Client: **Tetra Tech NUS, Inc.** ALS Project ID: P1500308
Client Project ID: **LC39A GW Interim Measure / 112G06925**

Method Blank Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Lab File ID: 02031504.D
Analyst: Lusine Hakobyan Date Analyzed: 2/3/15
Sample Type: 6.0 L Summa Canister(s) Time Analyzed: 02:47
Test Notes:

Client Sample ID	ALS Sample ID	Lab File ID	Time Analyzed
Lab Control Sample	P150203-LCS	02031505.D	03:21
LC39A-AIR-Baseline-20150124	P1500308-001	02031525.D	17:59
LC39A-AIR-Startup D1-20150125	P1500308-002	02031526.D	18:35
LC39A-AIR-Startup D1-20150125 (Lab Duplicate)	P1500308-002DUP	02031527.D	19:10

Client: **Tetra Tech NUS, Inc.** ALS Project ID: P1500308

Client Project ID: **LC39A GW Interim Measure / 112G06925**

Internal Standard Area and RT Summary

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Lab File ID: 02031503.D

Analyst: Lusine Hakobyan Date Analyzed: 2/3/15

Sample Type: 6.0 L Summa Canister(s) Time Analyzed: 02:11

Test Notes:

		IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	24 Hour Standard	193257	11.21	876054	13.34	304625	17.65
	Upper Limit	270560	11.54	1226476	13.67	426475	17.98
	Lower Limit	115954	10.88	525632	13.01	182775	17.32
	Client Sample ID						
01	Method Blank	175451	11.20	859547	13.33	301123	17.65
02	Lab Control Sample	185053	11.21	851569	13.34	307709	17.65
03	LC39A-AIR-Baseline-20150124	192644	11.19	925997	13.33	340810	17.65
04	LC39A-AIR-Startup D1-20150125	186379	11.19	916933	13.33	325258	17.65
05	LC39A-AIR-Startup D1-20150125 (Lab Duplicat	189063	11.20	923895	13.33	334784	17.65
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area
AREA LOWER LIMIT = 60% of internal standard area
RT UPPER LIMIT = 0.33 minutes of internal standard RT
RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.
I = Internal standard not within the speicified limits.

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015 02\03\02031525.D
Acq On : 3 Feb 2015 17:59 Operator: LH
Sample : P1500308-001 (1000mL)
Misc : S29-01071501
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 06 12:13:01 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014 LH 2/6/15
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	192644	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.33	114	925997	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	340810	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.05	65	212317	12.743	ng		0.00
Spiked Amount 12.500			Recovery = 101.92%				
57) Toluene-d8 (SS2)	15.78	98	803757	12.014	ng		0.00
Spiked Amount 12.500			Recovery = 96.08%				
73) Bromofluorobenzene (SS3)	19.04	174	424346	12.999	ng		0.00
Spiked Amount 12.500			Recovery = 104.00%				
Target Compounds							Qvalue
2) Propene	0.00	42	0	N.D. d			
3) Dichlorodifluoromethan...	4.28	85	55547	1.465	ng		99
4) Chloromethane	4.57	50	8029	0.314	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.82	135	1398	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.35	45	36079	3.017	ng		96
11) Acetonitrile	6.62	41	46634	1.562	ng		90
12) Acrolein	6.83	56	4002	0.380	ng		97
13) Acetone	7.03	58	56870m	4.404	ng		
14) Trichlorofluoromethane	7.28	101	22135	0.800	ng		98
15) 2-Propanol (Isopropanol)	7.52	45	26142	0.641	ng		97
16) Acrylonitrile	7.80	53	715	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	8.45	59	1586	N.D.			
19) Methylene Chloride	8.46	84	5035	0.251	ng		100
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.			
21) Trichlorotrifluoroethane	8.89	151	5282	0.299	ng		98
22) Carbon Disulfide	8.74	76	3302	N.D.			
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	10.13	73	881	N.D.			
26) Vinyl Acetate	10.22	86	3335	0.761	ng	#	44
27) 2-Butanone (MEK)	10.52	72	9585	0.773	ng		99
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	11.33	61	21051	3.345	ng		96
31) n-Hexane	11.31	57	4037	0.164	ng	#	97
32) Chloroform	11.36	83	1512	N.D.			
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	12.18	62	780	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	12.94	78	19750	0.263	ng		99
42) Carbon Tetrachloride	13.09	117	6708	0.299	ng		97
43) Cyclohexane	13.23	84	1703	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.			
47) Trichloroethene	0.00	130	0	N.D.			
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	14.11	57	3419	N.D.			

Data File: I:\MS16\DATA\2015 02\03\02031525.D
Acq On : 3 Feb 2015 17:59 Operator: LH
Sample : P1500308-001 (1000mL)
Misc : S29-01071501
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 06 12:13:01 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

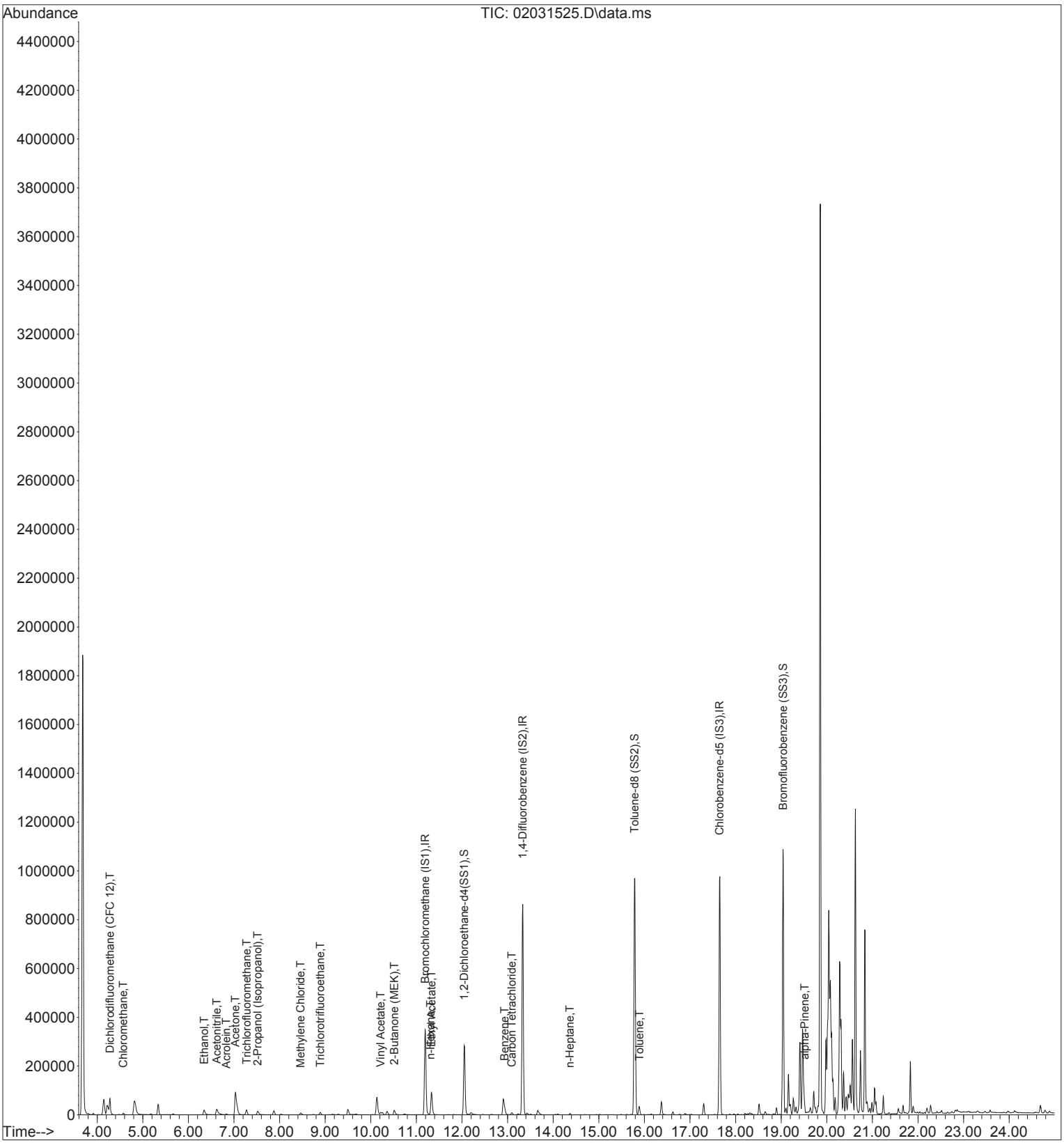
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.		
51) n-Heptane	14.37	71	1553	0.092 ng	#	84
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	15.89	91	31845	0.366 ng		98
59) 2-Hexanone	16.15	43	3180	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	16.77	43	2190	N.D.		
63) n-Octane	16.89	57	1197	N.D.		
64) Tetrachloroethene	17.03	166	711	N.D.		
65) Chlorobenzene	0.00	112	0	N.D.		
66) Ethylbenzene	18.05	91	3252	N.D.		
67) m- & p-Xylenes	18.21	91	5834	N.D.		
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.55	104	1888	N.D.		
70) o-Xylene	18.64	91	2676	N.D.		
71) n-Nonane	18.84	43	2783	N.D.		
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.		
74) Cumene	19.17	105	1704	N.D.		
75) alpha-Pinene	19.52	93	5727	0.126 ng	#	1
76) n-Propylbenzene	19.59	91	4249	N.D.		
77) 3-Ethyltoluene	19.71	105	4840	N.D.		
78) 4-Ethyltoluene	19.71	105	4840	N.D.		
79) 1,3,5-Trimethylbenzene	19.81	105	2068	N.D.		
80) alpha-Methylstyrene	20.13	118	1286	N.D.		
81) 2-Ethyltoluene	19.98	105	929	N.D.		
82) 1,2,4-Trimethylbenzene	20.18	105	2896	N.D.		
83) n-Decane	0.00	57	0	N.D. d		
84) Benzyl Chloride	20.29	91	853	N.D.		
85) 1,3-Dichlorobenzene	20.37	146	746	N.D.		
86) 1,4-Dichlorobenzene	20.37	146	746	N.D.		
87) sec-Butylbenzene	20.50	105	596	N.D.		
88) 4-Isopropyltoluene (p-...	20.55	119	4025	N.D.		
89) 1,2,3-Trimethylbenzene	20.55	105	2176	N.D.		
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	20.68	68	1690	N.D.		
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	21.37	57	2084	N.D.		
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.		
95) Naphthalene	22.29	128	9212	N.D.		
96) n-Dodecane	0.00	57	0	N.D. d		
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	0.00	55	0	N.D. d		
99) tert-Butylbenzene	20.18	119	636	N.D.		
100) n-Butylbenzene	0.00	91	0	N.D. d		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015 02\03\02031525.D
Acq On : 3 Feb 2015 17:59 Operator: LH
Sample : P1500308-001 (1000mL)
Misc : S29-01071501
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 06 12:13:01 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031525.D
Acq On : 3 Feb 2015 17:59 Operator: LH
Sample : P1500308-001 (1000mL)
Misc : S29-01071501
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 06 12:13:01 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 2/6/15

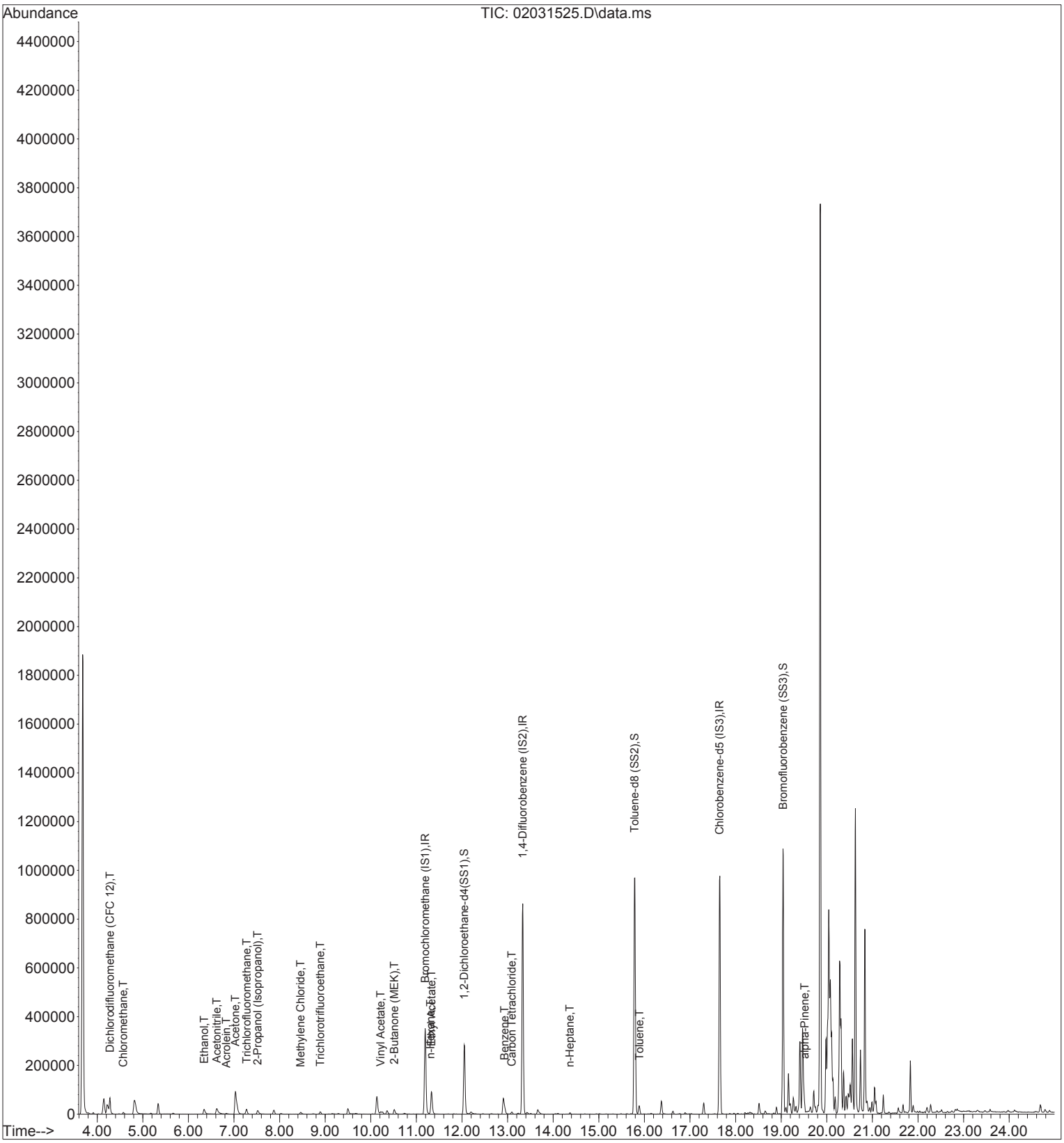
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	192644	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.33	114	925997	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	340810	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.05	65	212317	12.743	ng		0.00
Spiked Amount 12.500			Recovery = 101.92%				
57) Toluene-d8 (SS2)	15.78	98	803757	12.014	ng		0.00
Spiked Amount 12.500			Recovery = 96.08%				
73) Bromofluorobenzene (SS3)	19.04	174	424346	12.999	ng		0.00
Spiked Amount 12.500			Recovery = 104.00%				
Target Compounds							Qvalue
3) Dichlorodifluoromethan...	4.28	85	55547	1.465	ng		99
4) Chloromethane	4.57	50	8029	0.314	ng		99
10) Ethanol	6.35	45	36079	3.017	ng		96
11) Acetonitrile	6.62	41	46634	1.562	ng		90
12) Acrolein	6.83	56	4002	0.380	ng		97
13) Acetone	7.03	58	56870m	4.404	ng		
14) Trichlorofluoromethane	7.28	101	22135	0.800	ng		98
15) 2-Propanol (Isopropanol)	7.52	45	26142	0.641	ng		97
19) Methylene Chloride	8.46	84	5035	0.251	ng		100
21) Trichlorotrifluoroethane	8.89	151	5282	0.299	ng		98
26) Vinyl Acetate	10.22	86	3335	0.761	ng	#	44
27) 2-Butanone (MEK)	10.52	72	9585	0.773	ng		99
30) Ethyl Acetate	11.33	61	21051	3.345	ng		96
31) n-Hexane	11.31	57	4037	0.164	ng	#	97
41) Benzene	12.94	78	19750	0.263	ng		99
42) Carbon Tetrachloride	13.09	117	6708	0.299	ng		97
51) n-Heptane	14.37	71	1553	0.092	ng	#	84
58) Toluene	15.89	91	31845	0.366	ng		98
75) alpha-Pinene	19.52	93	5727	0.126	ng	#	1

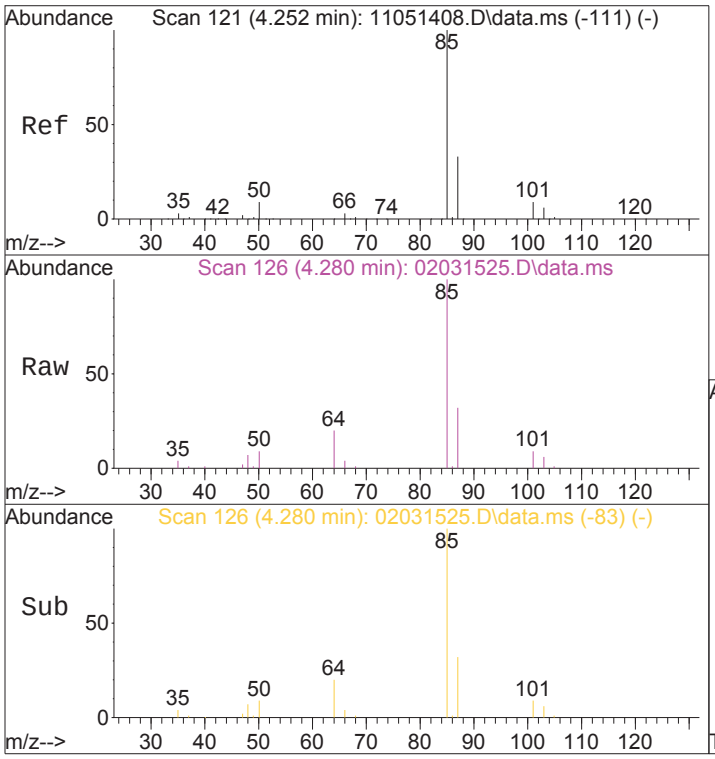
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031525.D
Acq On : 3 Feb 2015 17:59 Operator: LH
Sample : P1500308-001 (1000mL)
Misc : S29-01071501
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 06 12:13:01 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

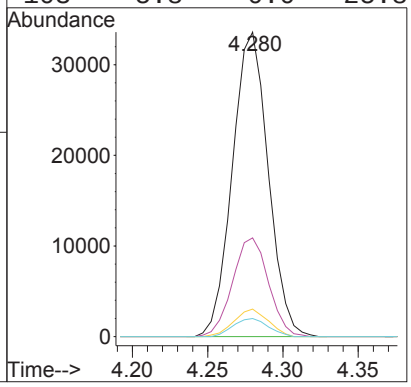


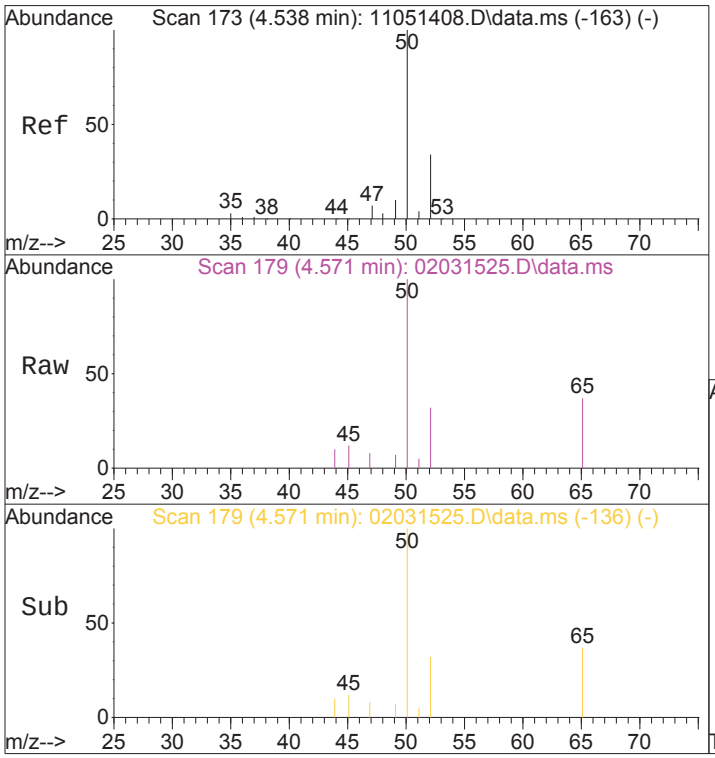


#3
Dichlorodifluoromethane (CFC 12)
Concen: 1.47 ng
RT: 4.28 min Scan# 126
Delta R.T. -0.011 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 85 Resp: 55547

Ion	Ratio	Lower	Upper
85	100		
87	32.5	12.8	52.8
101	8.6	0.0	28.9
103	5.8	0.0	25.8

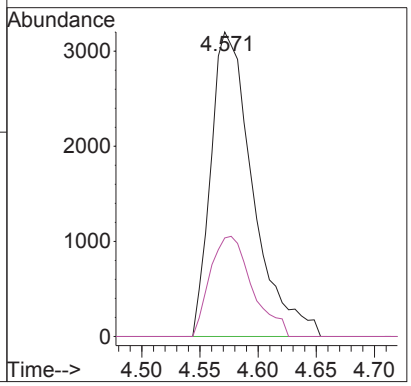


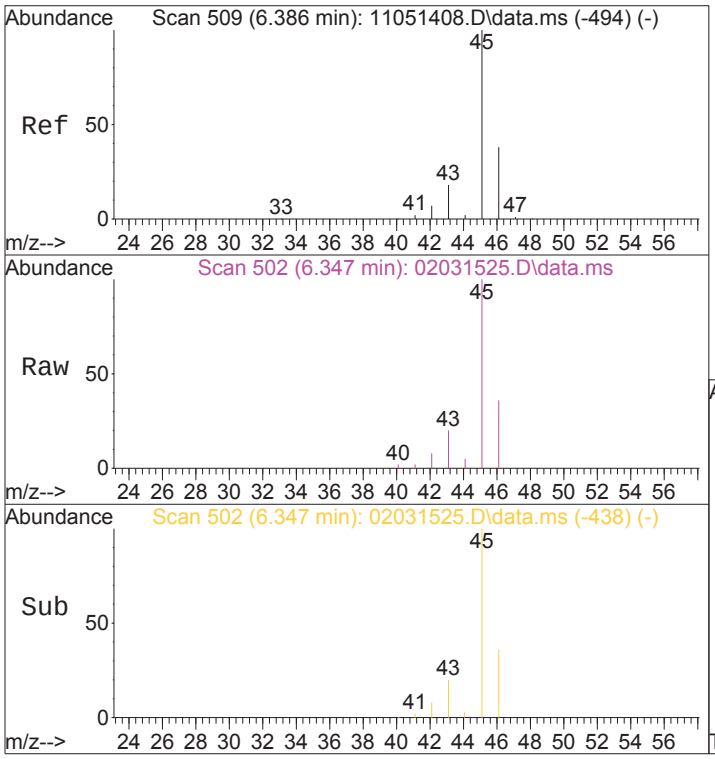


#4
Chloromethane
Concen: 0.31 ng
RT: 4.57 min Scan# 179
Delta R.T. -0.011 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 50 Resp: 8029

Ion	Ratio	Lower	Upper
50	100		
52	33.0	13.3	53.3

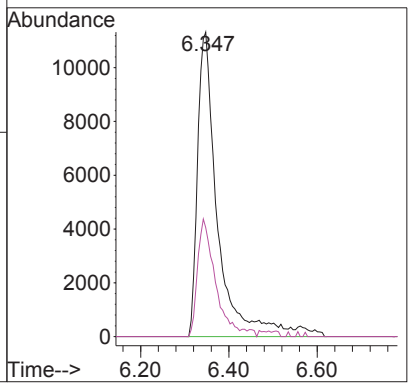


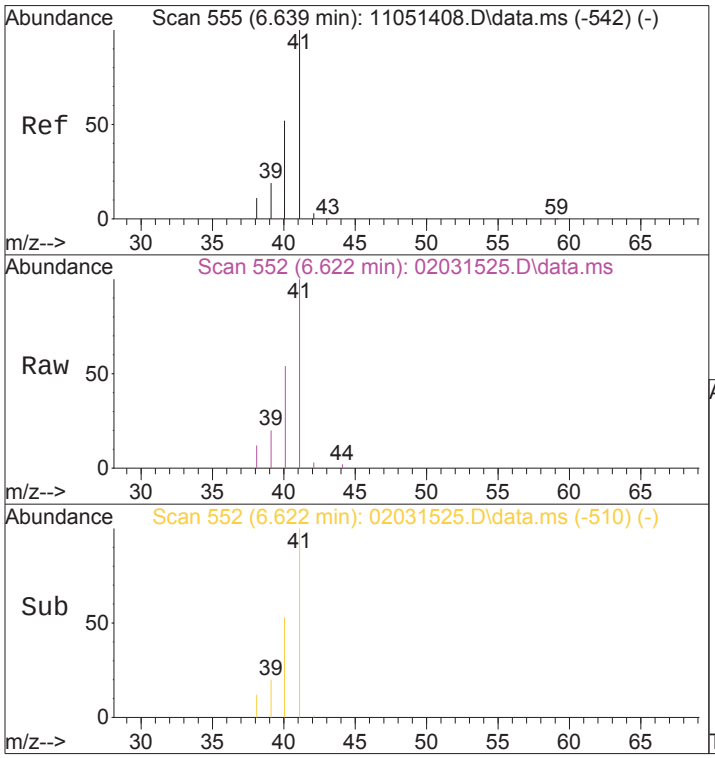


#10
Ethanol
Concen: 3.02 ng
RT: 6.35 min Scan# 502
Delta R.T. 0.000 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 45 Resp: 36079

Ion	Ratio	Lower	Upper
45	100		
46	34.7	17.3	57.3

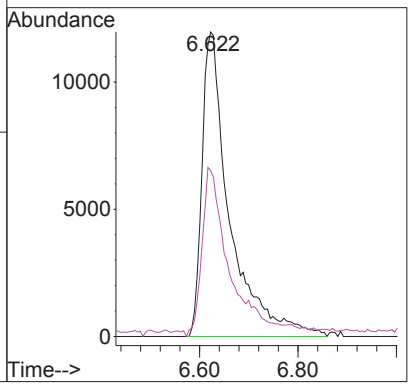


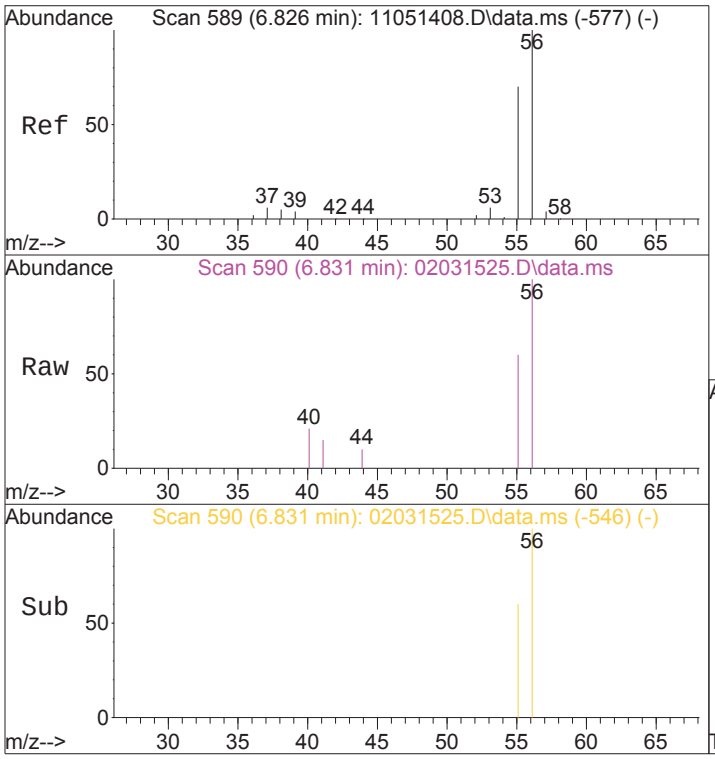


#11
Acetonitrile
Concen: 1.56 ng
RT: 6.62 min Scan# 552
Delta R.T. -0.017 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 41 Resp: 46634

Ion	Ratio	Lower	Upper
41	100		
40	58.5	31.8	71.8

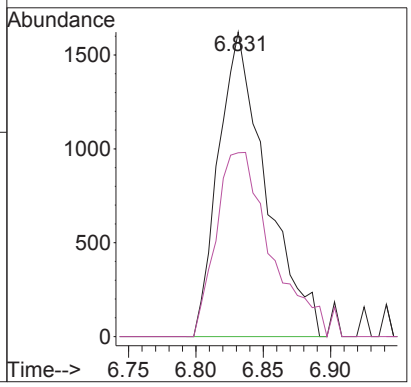


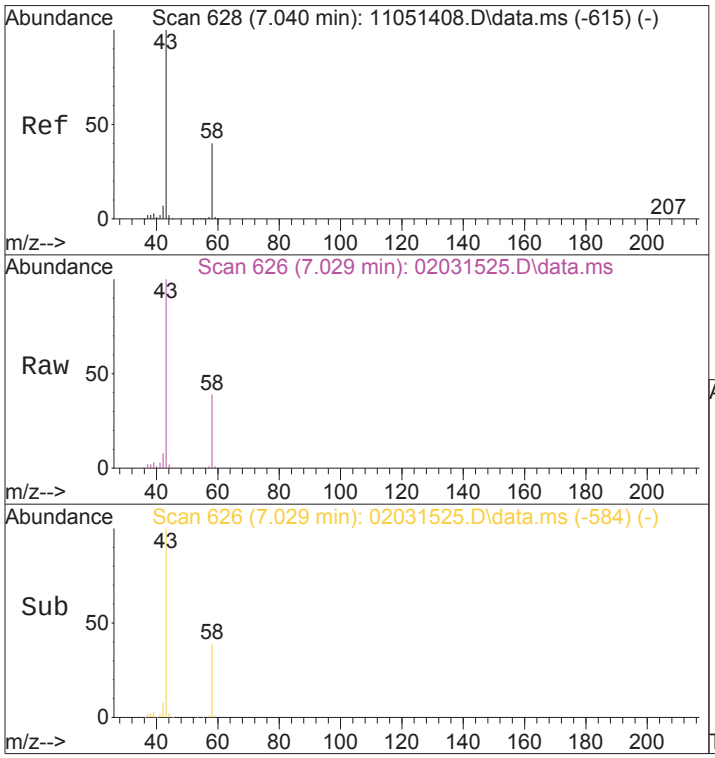


#12
Acrolein
Concen: 0.38 ng
RT: 6.83 min Scan# 590
Delta R.T. -0.011 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 56 Resp: 4002

Ion	Ratio	Lower	Upper
56	100		
55	70.8	48.3	88.3

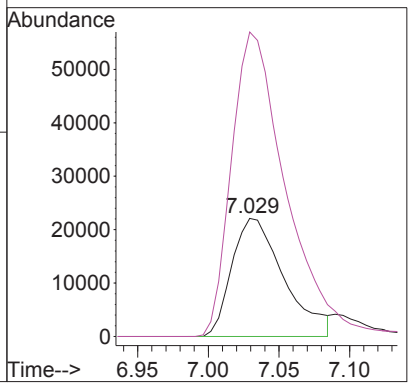


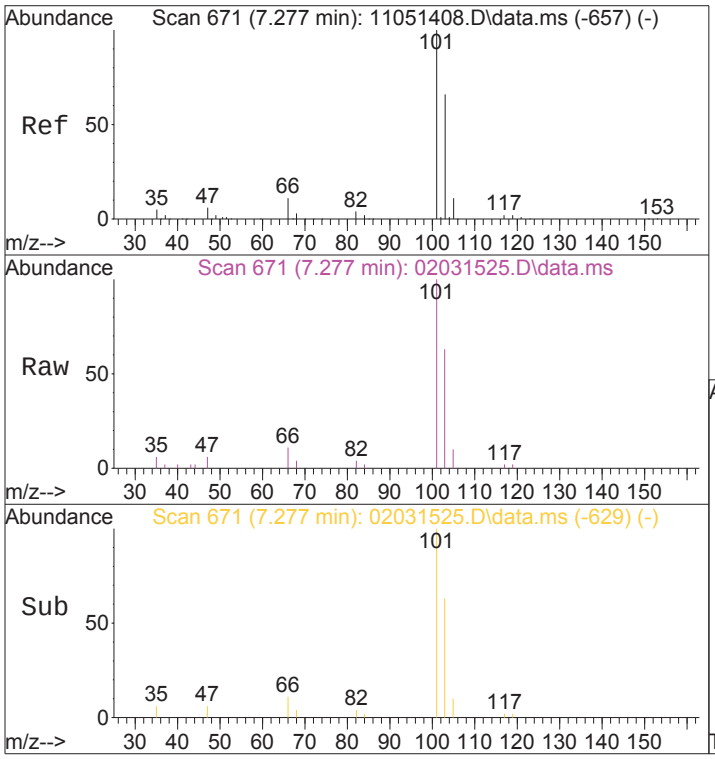


#13
Acetone
Concen: 4.40 ng m
RT: 7.03 min Scan# 626
Delta R.T. -0.017 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 58 Resp: 56870

Ion	Ratio	Lower	Upper
58	100		
43	275.1	220.1	280.1

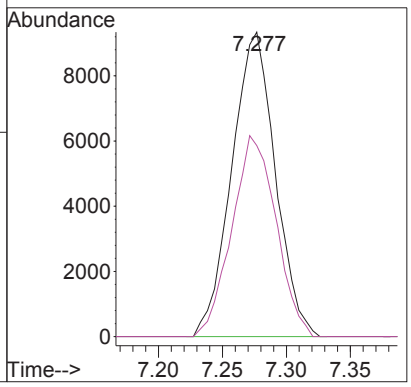


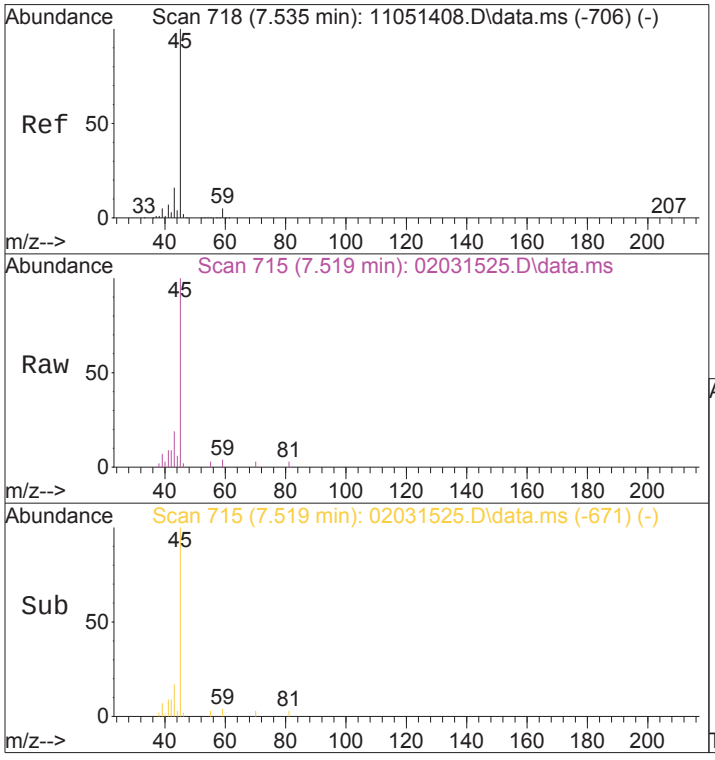


#14
Trichlorofluoromethane
Concen: 0.80 ng
RT: 7.28 min Scan# 671
Delta R.T. -0.016 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion:101 Resp: 22135

Ion	Ratio	Lower	Upper
101	100		
103	66.9	45.4	85.4

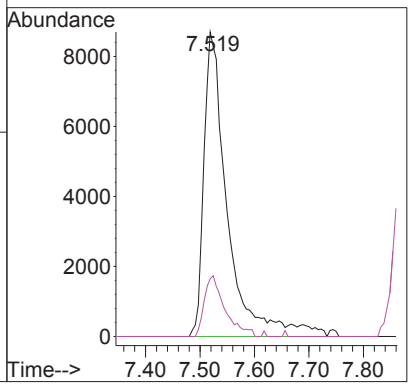


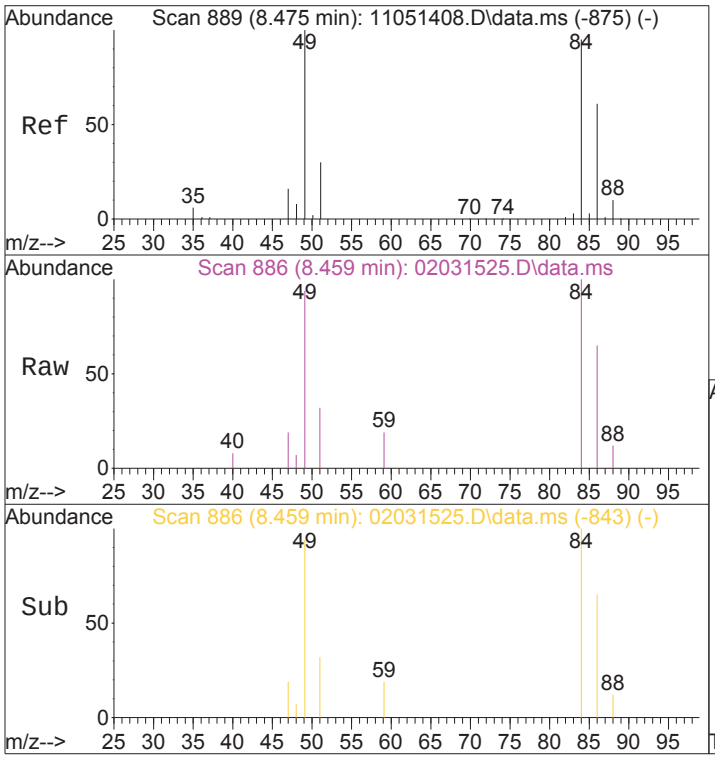


#15
2-Propanol (Isopropanol)
Concen: 0.64 ng
RT: 7.52 min Scan# 715
Delta R.T. -0.005 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 45 Resp: 26142

Ion	Ratio	Lower	Upper
45	100		
43	17.4	0.0	36.1

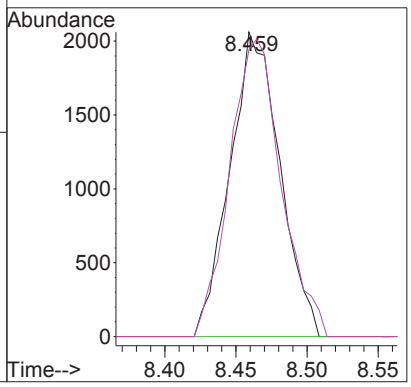


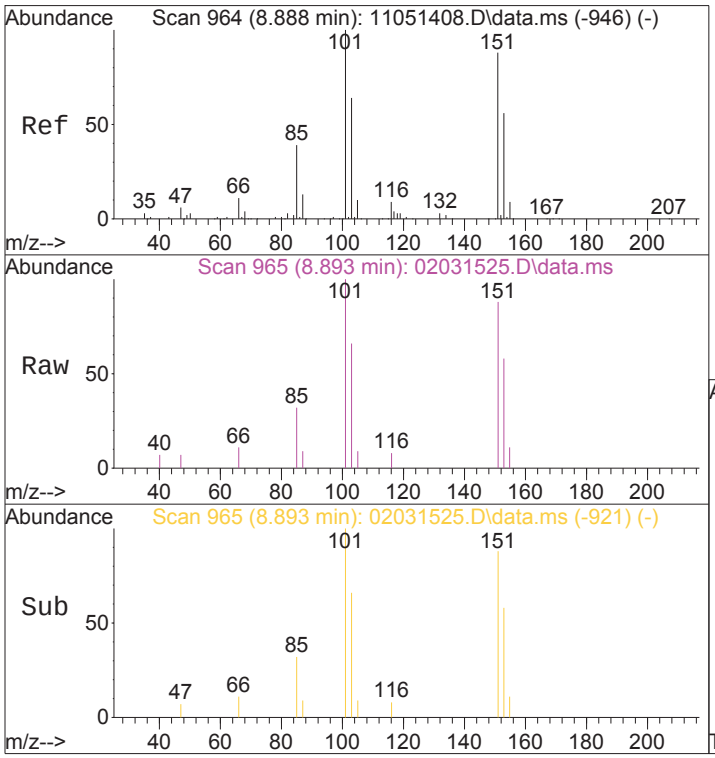


#19
Methylene Chloride
Concen: 0.25 ng
RT: 8.46 min Scan# 886
Delta R.T. -0.011 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 84 Resp: 5035

Ion	Ratio	Lower	Upper
84	100		
49	100.9	75.5	125.5

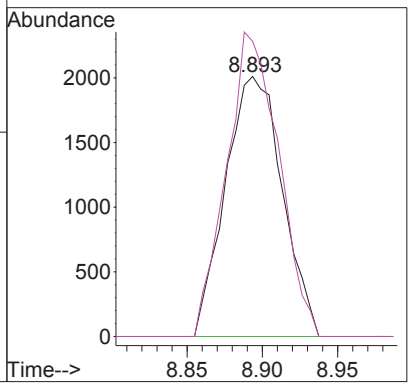


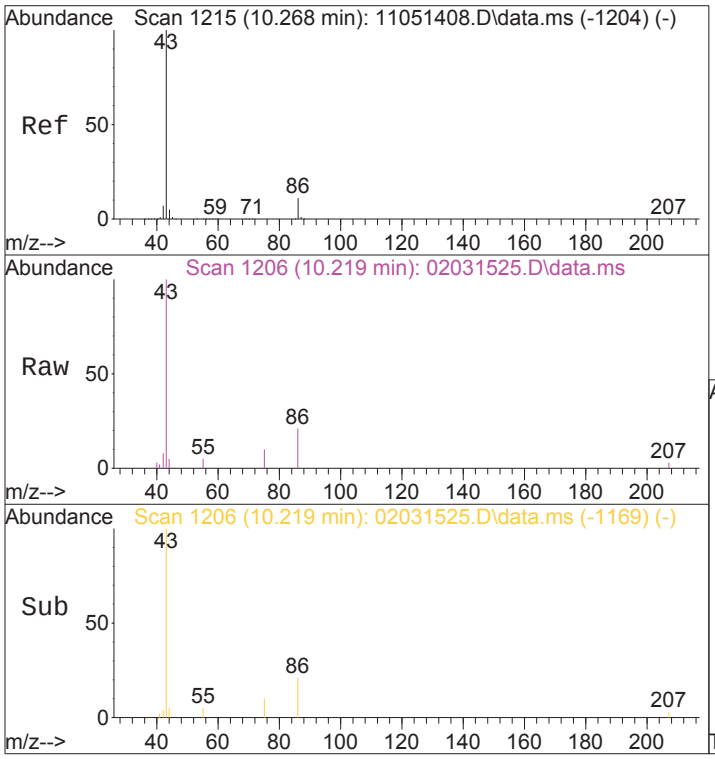


#21
Trichlorotrifluoroethane
Concen: 0.30 ng
RT: 8.89 min Scan# 965
Delta R.T. -0.005 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion:151 Resp: 5282

Ion	Ratio	Lower	Upper
151	100		
101	107.6	89.5	129.5

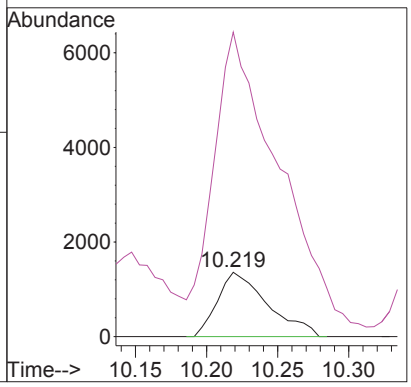


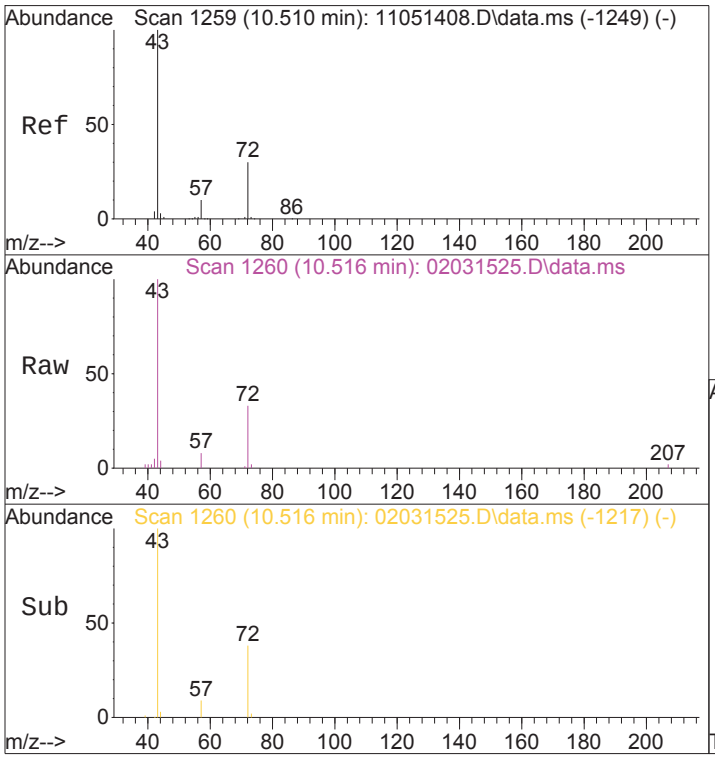


#26
Vinyl Acetate
Concen: 0.76 ng
RT: 10.22 min Scan# 1206
Delta R.T. -0.044 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 86 Resp: 3335

Ion	Ratio	Lower	Upper
86	100		
43	632.1	834.2	874.2#

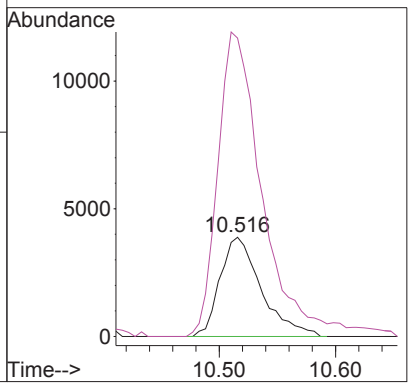


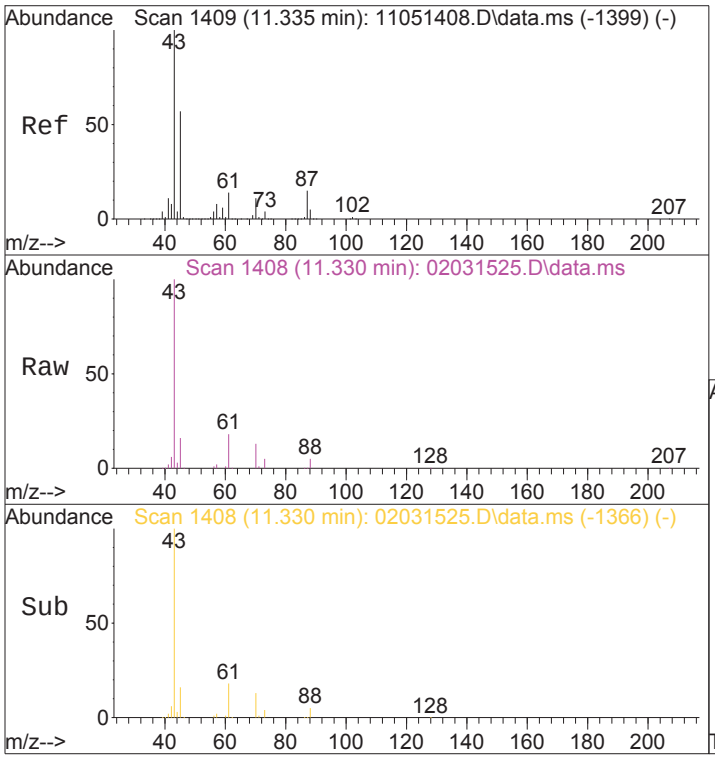


#27
2-Butanone (MEK)
Concen: 0.77 ng
RT: 10.52 min Scan# 1260
Delta R.T. -0.011 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 72 Resp: 9585

Ion	Ratio	Lower	Upper
72	100		
43	334.1	312.1	352.1

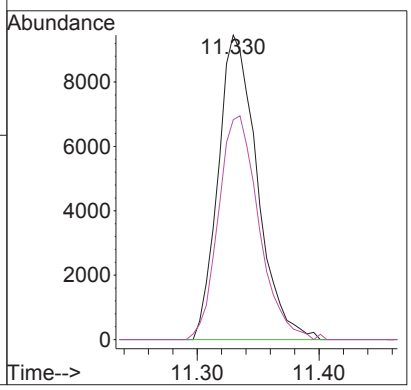


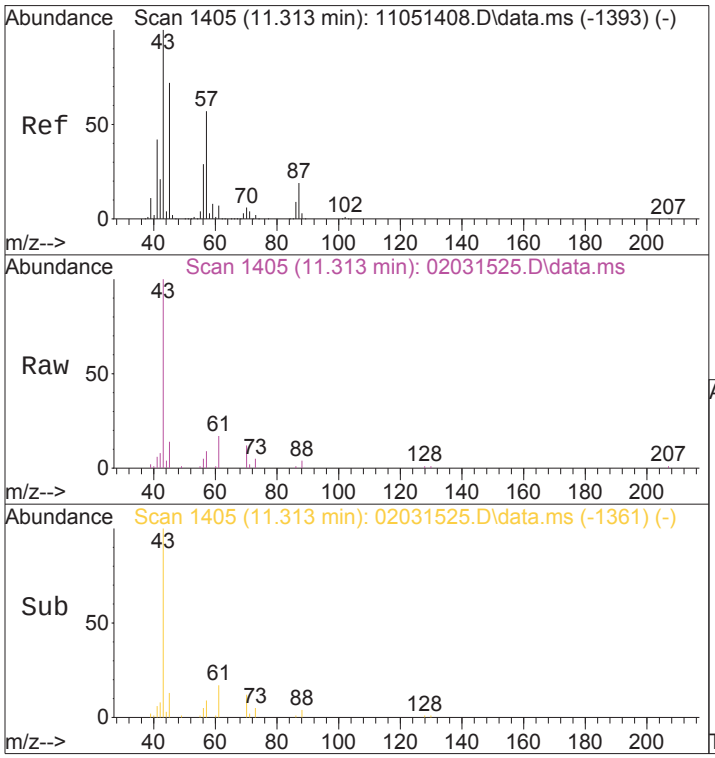


#30
Ethyl Acetate
Concen: 3.35 ng
RT: 11.33 min Scan# 1408
Delta R.T. -0.016 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 61 Resp: 21051

Ion	Ratio	Lower	Upper
61	100		
70	76.1	59.6	99.6

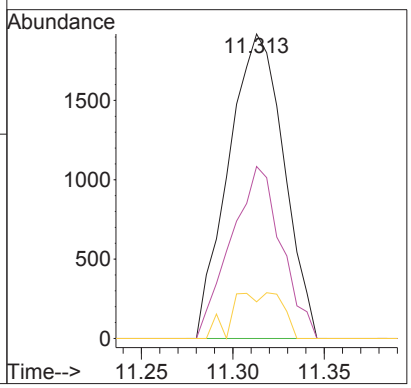


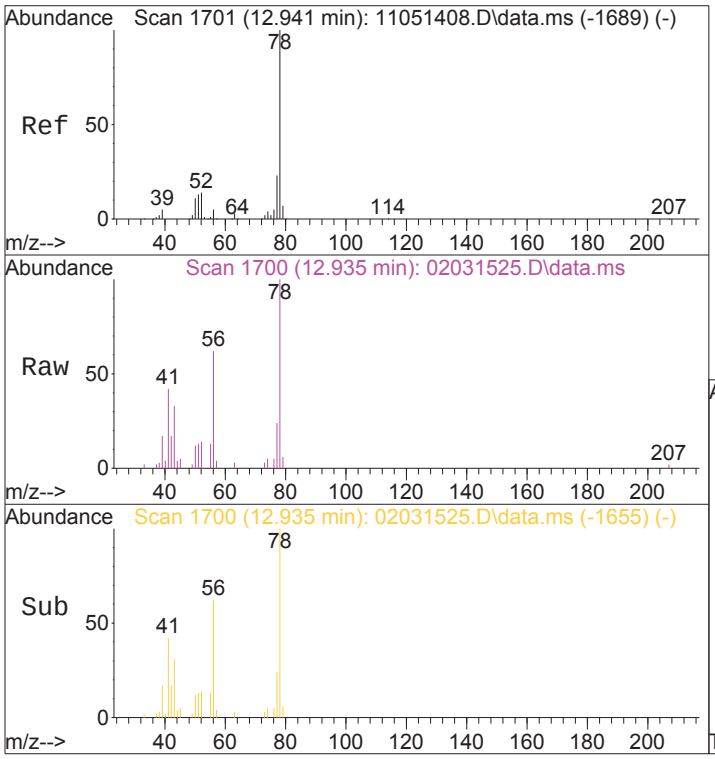


#31
n-Hexane
Concen: 0.16 ng
RT: 11.31 min Scan# 1405
Delta R.T. -0.005 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 57 Resp: 4037

Ion	Ratio	Lower	Upper
57	100		
56	51.4	40.7	61.1
86	13.8	14.0	21.0#

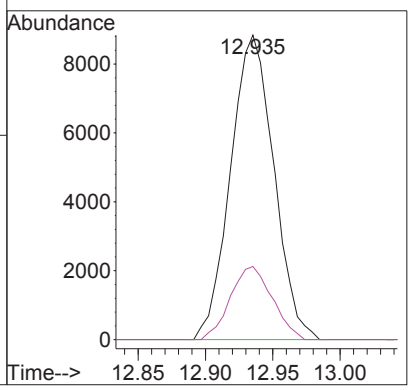


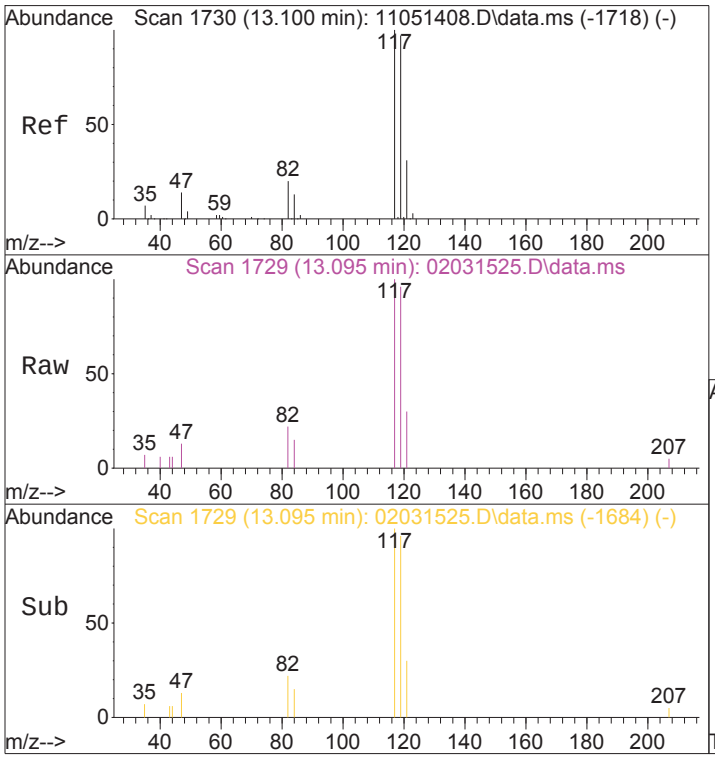


#41
Benzene
Concen: 0.26 ng
RT: 12.94 min Scan# 1700
Delta R.T. 0.000 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 78 Resp: 19750

Ion	Ratio	Lower	Upper
78	100		
77	23.2	2.9	42.9

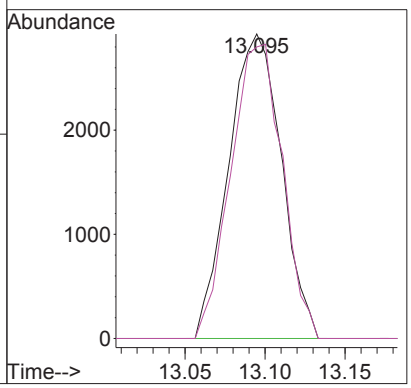


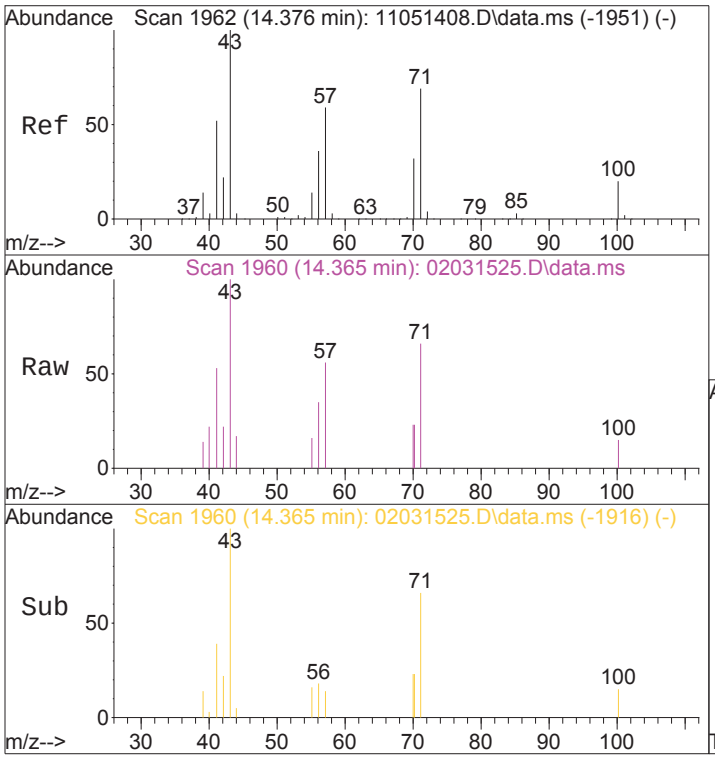


#42
Carbon Tetrachloride
Concen: 0.30 ng
RT: 13.09 min Scan# 1729
Delta R.T. 0.000 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion:117 Resp: 6708

Ion	Ratio	Lower	Upper
117	100		
119	94.8	77.6	117.6

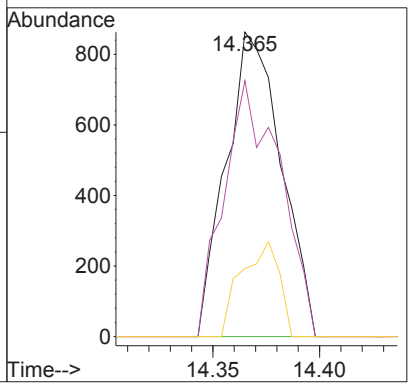


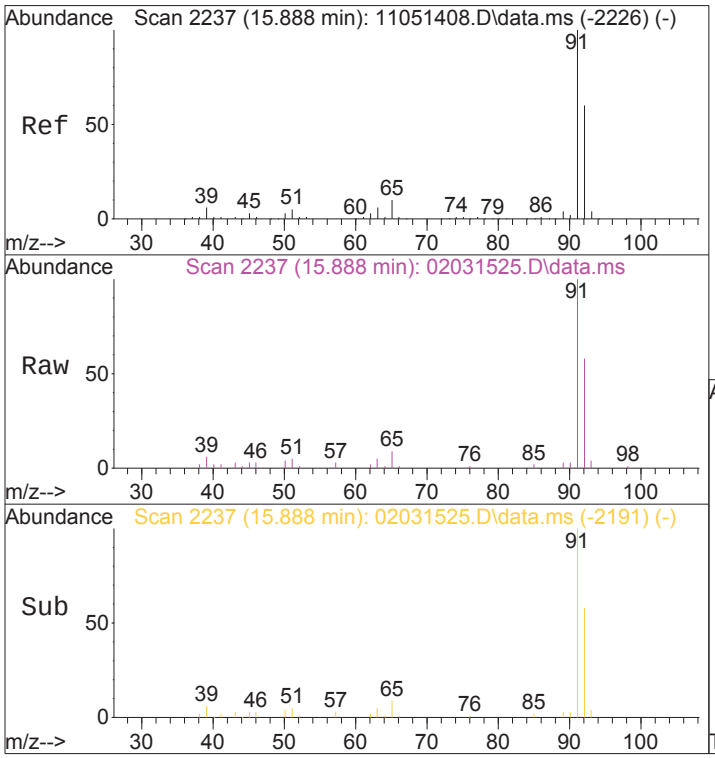


#51
n-Heptane
Concen: 0.09 ng
RT: 14.37 min Scan# 1960
Delta R.T. -0.005 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 71 Resp: 1553

Ion	Ratio	Lower	Upper
71	100		
57	85.6	64.5	104.5
100	0.0	10.7	50.7#

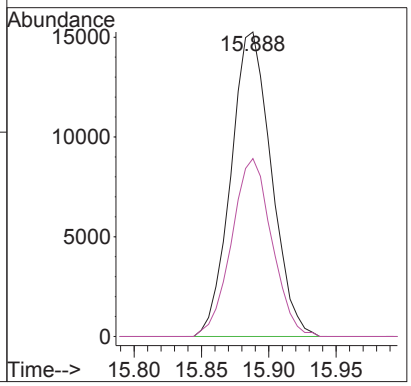


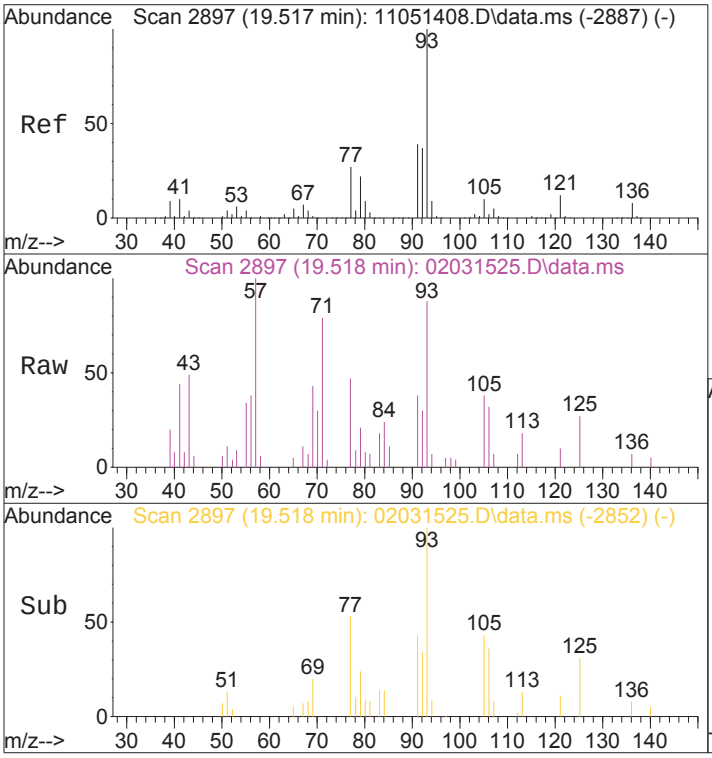


#58
Toluene
Concen: 0.37 ng
RT: 15.89 min Scan# 2237
Delta R.T. 0.006 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 91 Resp: 31845

Ion	Ratio	Lower	Upper
91	100		
92	58.2	40.1	80.1

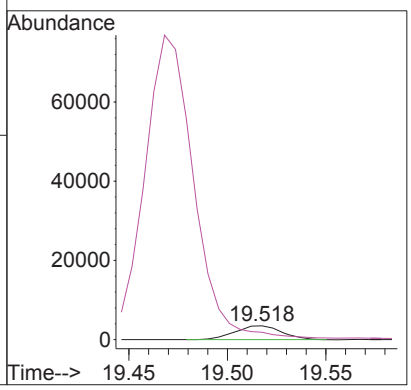




#75
alpha-Pinene
Concen: 0.13 ng
RT: 19.52 min Scan# 2897
Delta R.T. 0.000 min
Lab File: 02031525.D
Acq: 3 Feb 2015 17:59

Tgt Ion: 93 Resp: 5727

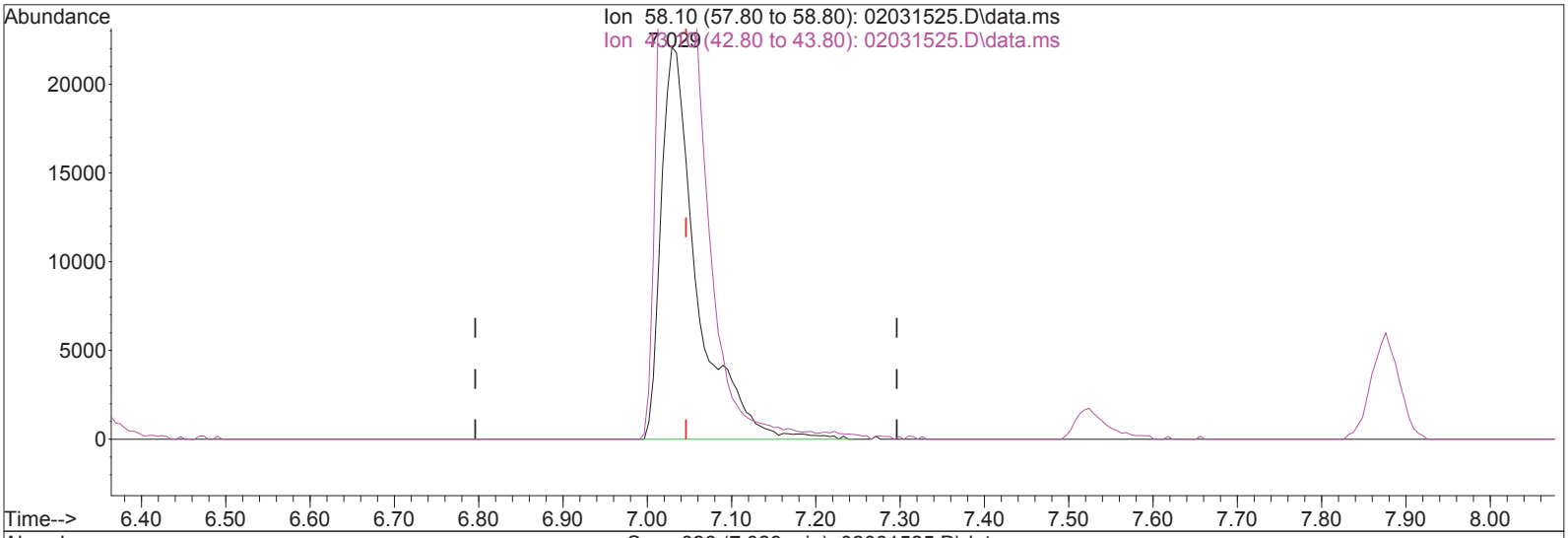
Ion	Ratio	Lower	Upper
93	100		
77	2372.2	6.5	46.5#

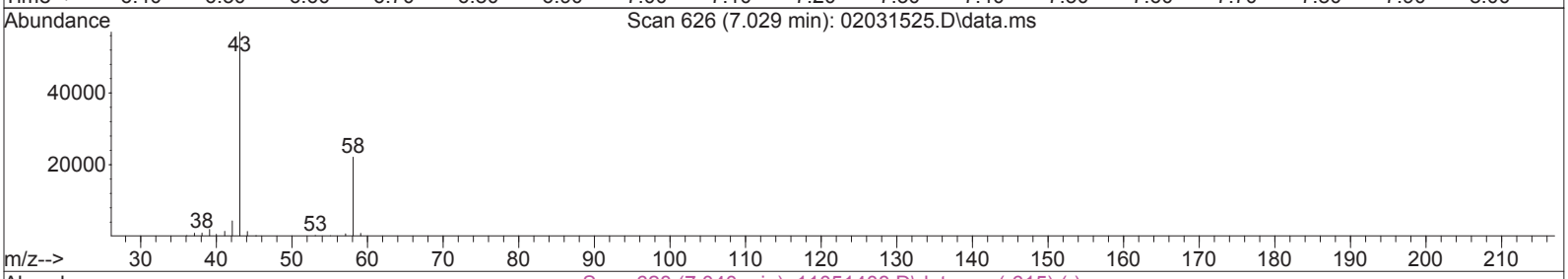


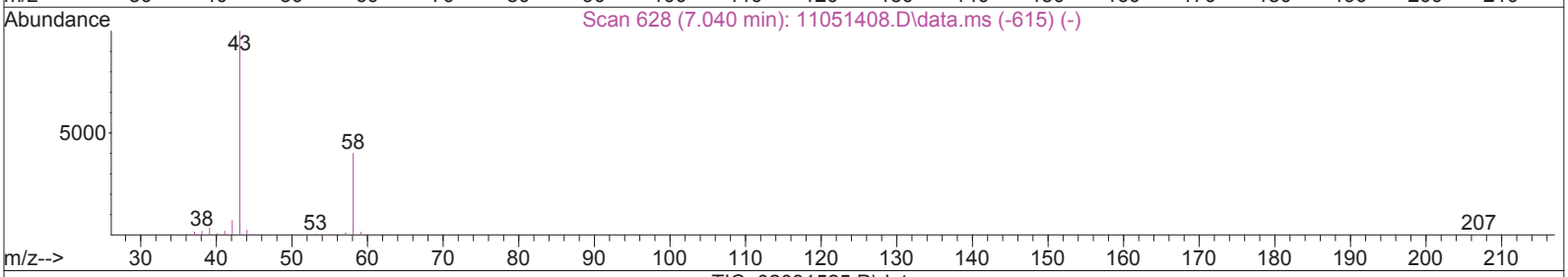
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2015_02\03\02031525.D
Acq On : 3 Feb 2015 17:59 Operator: LH
Sample : P1500308-001 (1000mL)
Misc : S29-01071501
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 04 07:07:13 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 02031525.D\data.ms

(13) Acetone (T)

7.029min (-0.017) 5.06ng

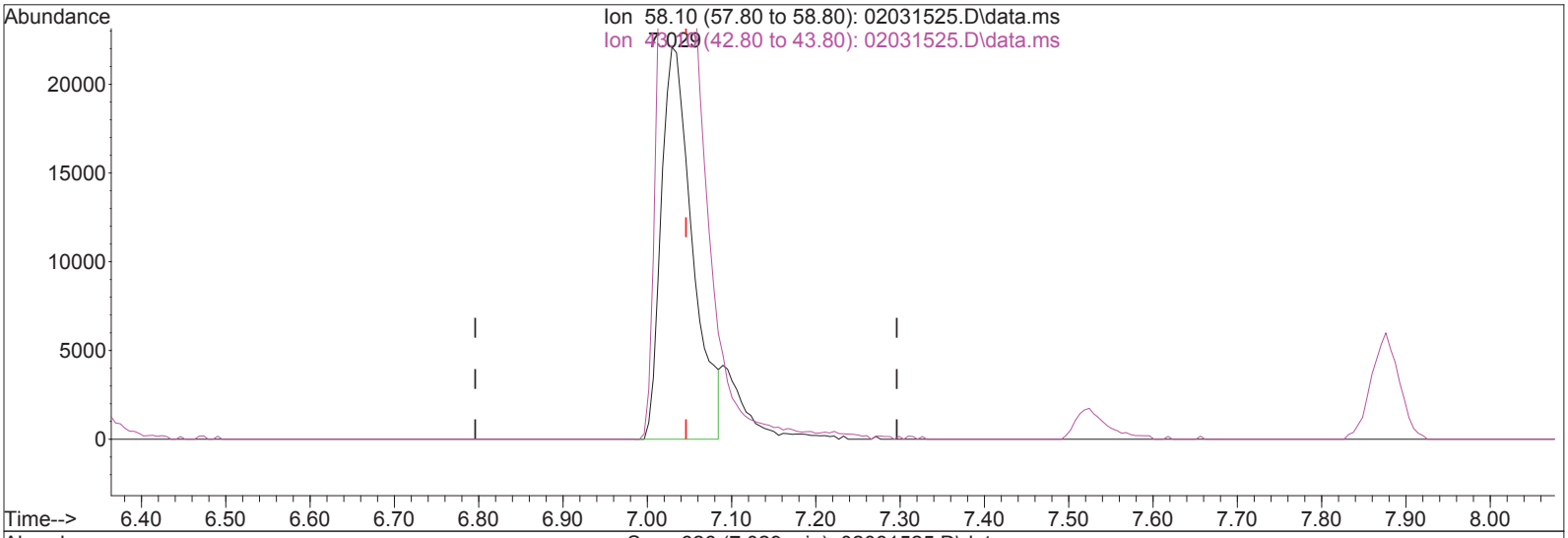
response 65346

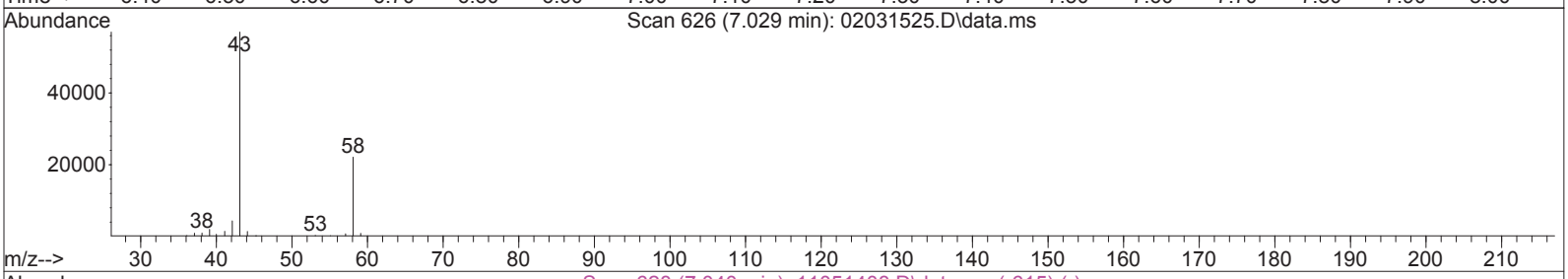
Ion	Exp%	Act%
58.10	100	100
43.10	250.10	239.46
0.00	0.00	0.00
0.00	0.00	0.00

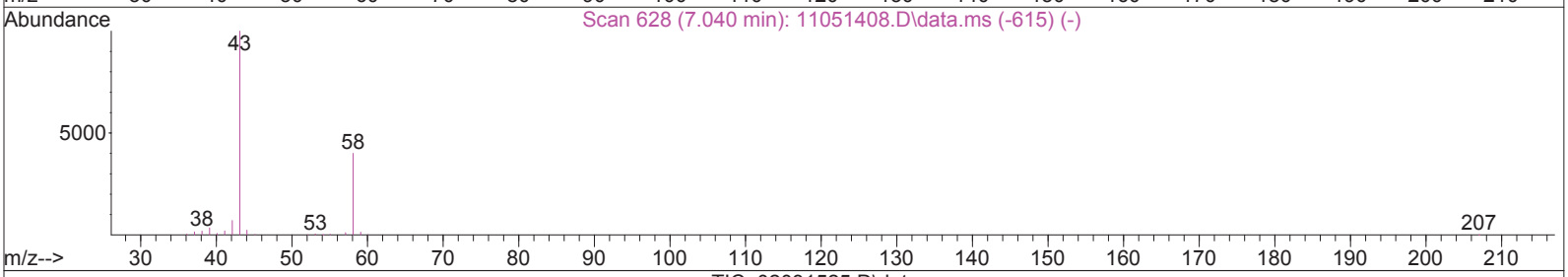
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2015_02\03\02031525.D
Acq On : 3 Feb 2015 17:59 Operator: LH
Sample : P1500308-001 (1000mL)
Misc : S29-01071501
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 04 07:07:13 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 02031525.D\data.ms

(13) Acetone (T)

7.029min (-0.017) 4.40ng m

response 56870

Ion	Exp%	Act%
58.10	100	100
43.10	250.10	275.15
0.00	0.00	0.00
0.00	0.00	0.00

IPC

LH 2/6/15

2/6/15

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031525.D
Acq On : 3 Feb 2015 17:59 Operator: LH
Sample : P1500308-001 (1000mL)
Misc : S29-01071501
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 06 12:22:23 2015
Quant Method : I:\MS16\METHODS\ACF16110414.M LH 2/6/15
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : ed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

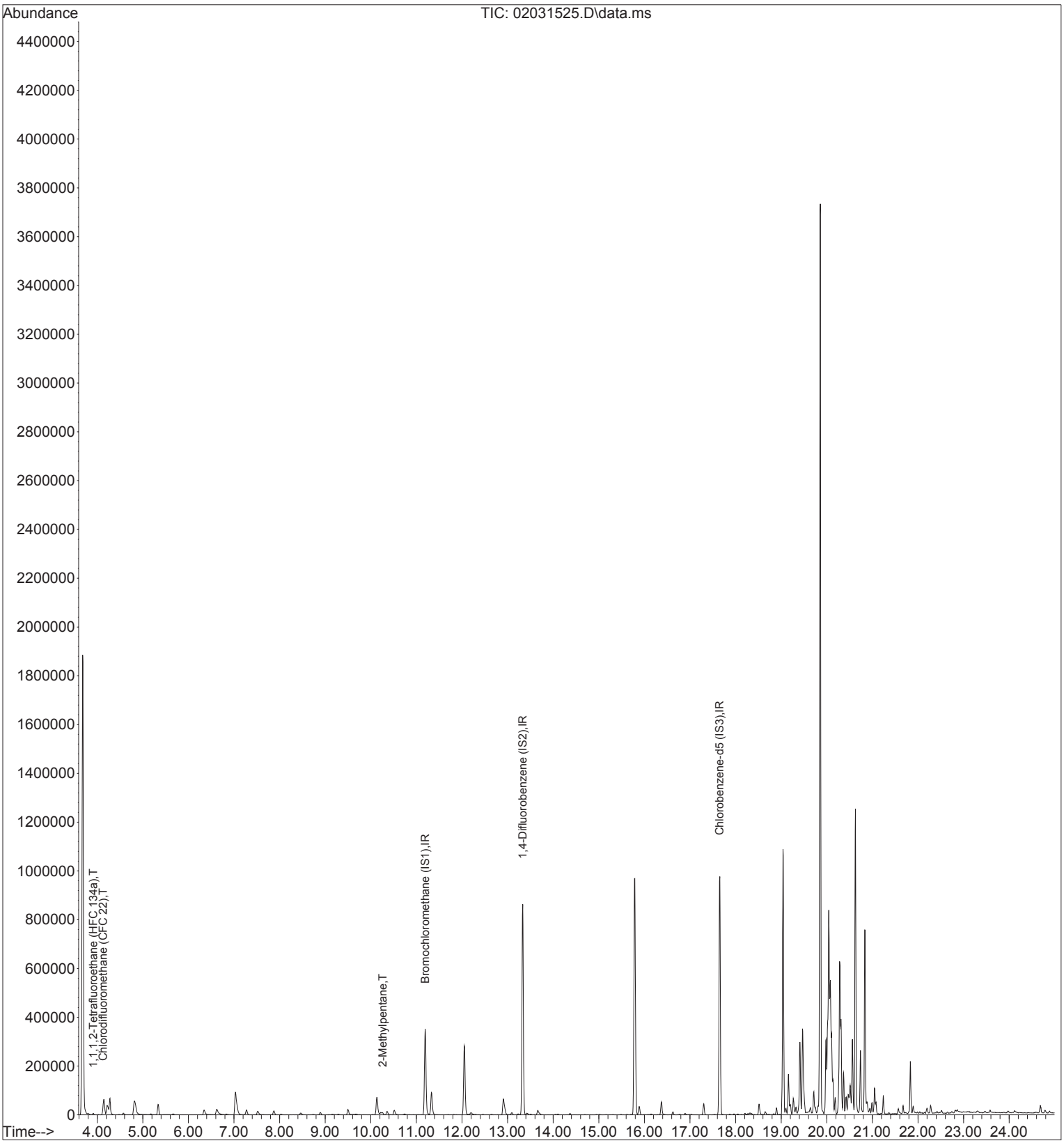
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	192644	12.500	ng		-0.02
16) 1,4-Difluorobenzene (IS2)	13.33	114	925997	12.500	ng		-0.01
19) Chlorobenzene-d5 (IS3)	17.65	82	340810	12.500	ng		-0.02
Target Compounds							Qvalue
2) Chloropentafluoroethane	3.82	85	1104	N.D.			
3) 1,1,1,2-Tetrafluoroeth...	3.91	83	2624	0.170	ng	#	67
4) 1,1-Difluoroethane	4.03	65	625	N.D.			
5) Chlorodifluoromethane ...	4.13	67	1742	0.404	ng		91
6) 1-Chloro-1,1-Difluoroe...	4.58	65	1890	N.D.			
7) Dichlorofluoromethane ...	6.27	67	528	N.D.			
8) Vinylbromide	0.00	108	0	N.D.			
9) 2,2-Dichloro-1,1,1-tri...	6.98	83	245	N.D.			
10) 2-Methylbutane	0.00	57	0	N.D.	d		
11) Methyl Acetate	8.49	43	2417	N.D.			
12) 2-Methylpentane	10.26	71	2032	0.108	ng	#	1
13) 2,2-Dichloropropane	0.00	77	0	N.D.			
14) 1,1-Dichloropropene	12.80	75	309	N.D.			
15) Thiophene	13.09	84	1502	N.D.			
17) 2,3-Dimethylpentane	13.52	56	1451	N.D.			
18) Dibromomethane	13.75	174	342	N.D.			
20) Methyl Cyclohexane	15.01	55	1044	N.D.			
21) 1,3-Dichloropropane	15.91	76	562	N.D.			
22) 1,1,1,2-Tetrachloroethane	17.67	131	210	N.D.			
23) 1-Chlorohexane	17.87	91	836	N.D.			
24) 1,2,3-Trichloropropane	18.74	75	479	N.D.			
25) Bromobenzene	19.25	77	609	N.D.			
26) 2-Chlorotoluene	19.59	91	4249	N.D.			
27) 4-Chlorotoluene	19.71	91	427	N.D.			
28) Indan	20.73	117	2011	N.D.			
29) Indene	20.81	115	1083	N.D.			
30) 1,2,4,5-Tetramethylben...	21.57	119	1886	N.D.			
31) 1,2,3,4-Tetramethylben...	21.61	119	2031	N.D.			
32) 1,2,3,5-Tetramethylben...	21.94	119	1973	N.D.			
33) 1,2,3-Trichlorobenzene	22.53	180	874	N.D.			

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031525.D
Acq On : 3 Feb 2015 17:59 Operator: LH
Sample : P1500308-001 (1000mL)
Misc : S29-01071501
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 06 12:22:23 2015
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : ed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031526.D
Acq On : 3 Feb 2015 18:35 Operator: LH
Sample : P1500308-002 (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:15:05 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 2/6/15

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	186379	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.33	114	916933	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	325258	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.05	65	212887	13.207	ng		0.00
Spiked Amount 12.500			Recovery = 105.68%				
57) Toluene-d8 (SS2)	15.79	98	799983	12.530	ng		0.00
Spiked Amount 12.500			Recovery = 100.24%				
73) Bromofluorobenzene (SS3)	19.04	174	409214	13.135	ng		0.00
Spiked Amount 12.500			Recovery = 105.04%				
Target Compounds							Qvalue
2) Propene	4.12	42	23442	1.404	ng	#	76
3) Dichlorodifluoromethan...	4.27	85	63935	1.743	ng		100
4) Chloromethane	4.57	50	10565	0.427	ng		96
5) 1,2-Dichloro-1,1,2,2-t...	4.82	135	1769	N.D.			
6) Vinyl Chloride	4.98	62	2858	0.113	ng		93
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.34	45	178901	15.461	ng		99
11) Acetonitrile	6.63	41	3738	0.129	ng	#	57
12) Acrolein	6.83	56	3198	0.314	ng		95
13) Acetone	7.03	58	46922m	3.756	ng		
14) Trichlorofluoromethane	7.28	101	26431	0.987	ng		100
15) 2-Propanol (Isopropanol)	7.51	45	111500	2.824	ng		98
16) Acrylonitrile	0.00	53	0	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	8.43	59	2774	N.D.			
19) Methylene Chloride	8.46	84	5575	0.288	ng		97
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.			
21) Trichlorotrifluoroethane	8.89	151	49284	2.881	ng		99
22) Carbon Disulfide	8.73	76	4073	N.D.			
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	10.13	63	694	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D. d			
26) Vinyl Acetate	10.22	86	4128	0.974	ng	#	22
27) 2-Butanone (MEK)	10.51	72	10934	0.911	ng		95
28) cis-1,2-Dichloroethene	11.03	61	1719	N.D.			
29) Diisopropyl Ether	11.33	87	655	N.D.			
30) Ethyl Acetate	11.33	61	40090	6.585	ng		96
31) n-Hexane	11.31	57	3300	0.138	ng	#	88
32) Chloroform	11.36	83	1790	N.D.			
34) Tetrahydrofuran (THF)	11.81	72	511	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	12.17	62	871	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	12.93	78	17581	0.236	ng		94
42) Carbon Tetrachloride	13.09	117	6910	0.311	ng		98
43) Cyclohexane	13.23	84	983	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D. d			
46) Bromodichloromethane	0.00	83	0	N.D.			
47) Trichloroethene	14.04	130	599	N.D.			
48) 1,4-Dioxane	14.03	88	568	N.D.			
49) 2,2,4-Trimethylpentane...	14.11	57	5562	N.D.			

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031526.D
Acq On : 3 Feb 2015 18:35 Operator: LH
Sample : P1500308-002 (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:15:05 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

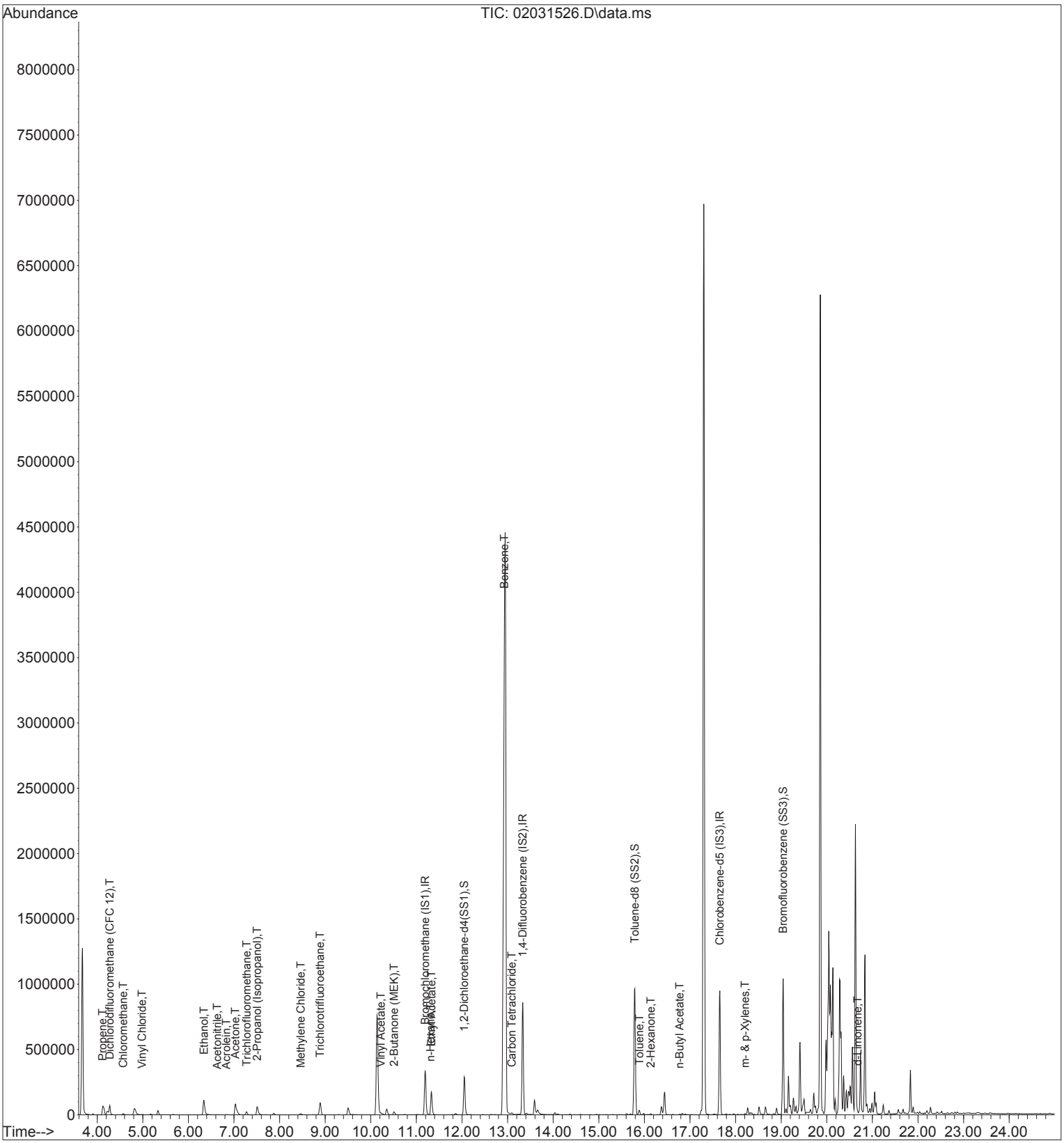
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.	
51) n-Heptane	14.37	71	1022	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	14.95	58	1265	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.89	91	31205	0.376 ng	100
59) 2-Hexanone	16.14	43	7636	0.223 ng	84
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.77	43	5513	0.143 ng	90
63) n-Octane	16.89	57	1169	N.D.	
64) Tetrachloroethene	17.04	166	1072	N.D.	
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	18.05	91	4036	N.D.	
67) m- p- ylenes	18.21	91	8634	0.128 ng	100
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.54	104	1638	N.D.	
70) o- ylene	18.64	91	3702	N.D.	
71) n-Nonane	0.00	43	0	N.D. d	
72) 1,1,2,2-Tetrachloroethane	18.65	83	572	N.D.	
74) Cumene	19.17	105	1548	N.D.	
75) alpha-Pinene	19.52	93	2287	N.D.	
76) n-Propylbenzene	19.61	91	3688	N.D.	
77) 3-Ethyltoluene	19.72	105	3674	N.D.	
78) 4-Ethyltoluene	19.75	105	1695	N.D.	
79) 1,3,5-Trimethylbenzene	19.81	105	1903	N.D.	
80) alpha-Methylstyrene	19.95	118	566	N.D.	
81) 2-Ethyltoluene	19.98	105	1407	N.D.	
82) 1,2,4-Trimethylbenzene	20.17	105	3884	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.29	91	929	N.D.	
85) 1,3-Dichlorobenzene	20.13	146	888	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	20.55	105	1917	N.D.	
88) 4-Isopropyltoluene (p-...	20.55	119	2946	N.D.	
89) 1,2,3-Trimethylbenzene	20.55	105	1917	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.68	68	2541	0.103 ng	81
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	0.00	57	0	N.D. d	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.29	128	2104	N.D.	
96) n-Dodecane	0.00	57	0	N.D. d	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D. d	
99) tert-Butylbenzene	0.00	119	0	N.D. d	
100) n-Butylbenzene	20.90	91	2607	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031526.D
Acq On : 3 Feb 2015 18:35 Operator: LH
Sample : P1500308-002 (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:15:05 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031526.D
Acq On : 3 Feb 2015 18:35 Operator: LH
Sample : P1500308-002 (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:15:05 2015 LH 2/6/15
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

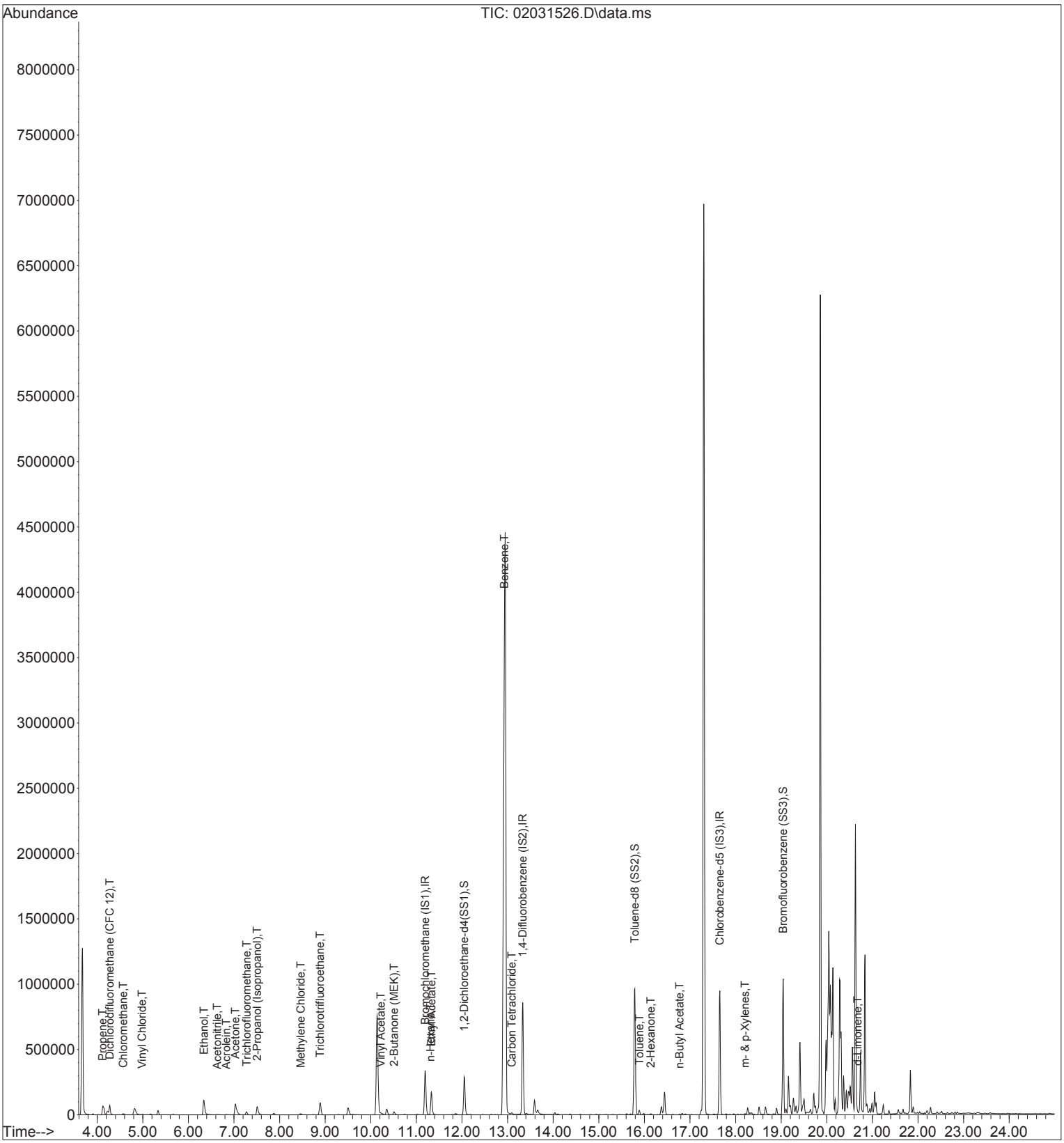
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	186379	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.33	114	916933	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	325258	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.05	65	212887	13.207	ng		0.00
Spiked Amount 12.500			Recovery = 105.68%				
57) Toluene-d8 (SS2)	15.79	98	799983	12.530	ng		0.00
Spiked Amount 12.500			Recovery = 100.24%				
73) Bromofluorobenzene (SS3)	19.04	174	409214	13.135	ng		0.00
Spiked Amount 12.500			Recovery = 105.04%				
Target Compounds							Qvalue
2) Propene	4.12	42	23442	1.404	ng	#	76
3) Dichlorodifluoromethan...	4.27	85	63935	1.743	ng		100
4) Chloromethane	4.57	50	10565	0.427	ng		96
6) Vinyl Chloride	4.98	62	2858	0.113	ng		93
10) Ethanol	6.34	45	178901	15.461	ng		99
11) Acetonitrile	6.63	41	3738	0.129	ng	#	57
12) Acrolein	6.83	56	3198	0.314	ng		95
13) Acetone	7.03	58	46922m	3.756	ng		
14) Trichlorofluoromethane	7.28	101	26431	0.987	ng		100
15) 2-Propanol (Isopropanol)	7.51	45	111500	2.824	ng		98
19) Methylene Chloride	8.46	84	5575	0.288	ng		97
21) Trichlorotrifluoroethane	8.89	151	49284	2.881	ng		99
26) Vinyl Acetate	10.22	86	4128	0.974	ng	#	22
27) 2-Butanone (MEK)	10.51	72	10934	0.911	ng		95
30) Ethyl Acetate	11.33	61	40090	6.585	ng		96
31) n-Hexane	11.31	57	3300	0.138	ng	#	88
41) Benzene	12.93	78	17581	0.236	ng		94
42) Carbon Tetrachloride	13.09	117	6910	0.311	ng		98
58) Toluene	15.89	91	31205	0.376	ng		100
59) 2-Hexanone	16.14	43	7636	0.223	ng		84
62) n-Butyl Acetate	16.77	43	5513	0.143	ng		90
67) m- p- ylenes	18.21	91	8634	0.128	ng		100
91) d-Limonene	20.68	68	2541	0.103	ng		81

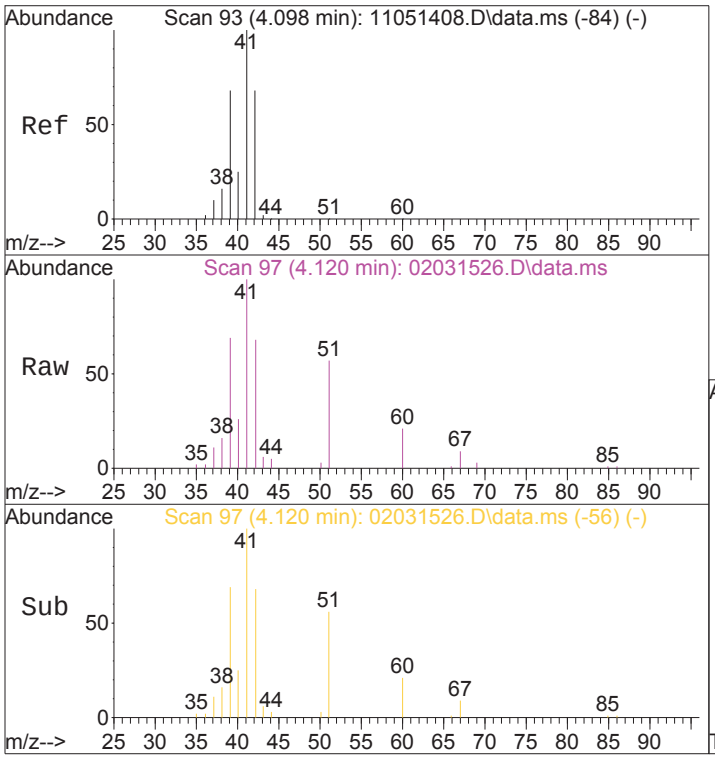
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031526.D
Acq On : 3 Feb 2015 18:35 Operator: LH
Sample : P1500308-002 (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:15:05 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

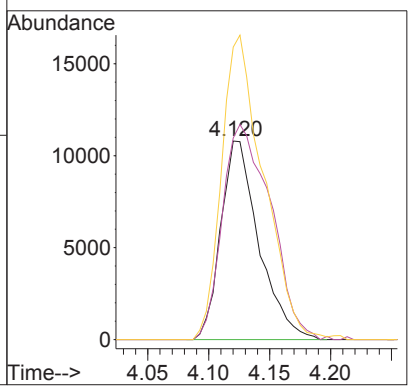


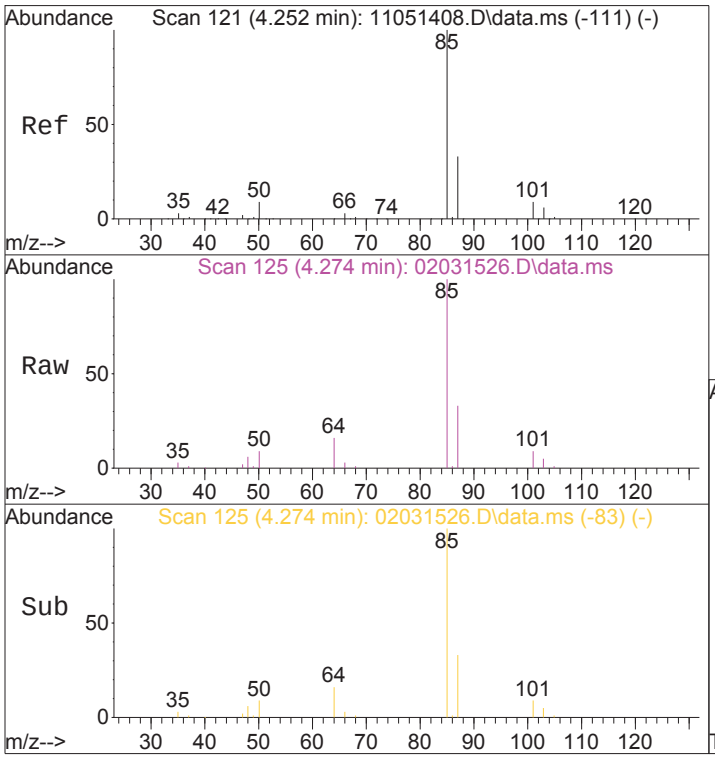


#2
Propene
Concen: 1.40 ng
RT: 4.12 min Scan# 97
Delta R.T. -0.022 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 42 Resp: 23442

Ion	Ratio	Lower	Upper
42	100		
39	137.3	81.4	121.4#
41	170.2	129.3	169.3#

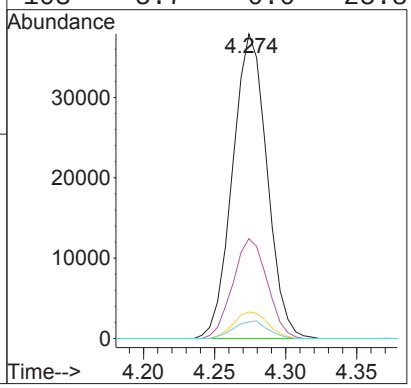


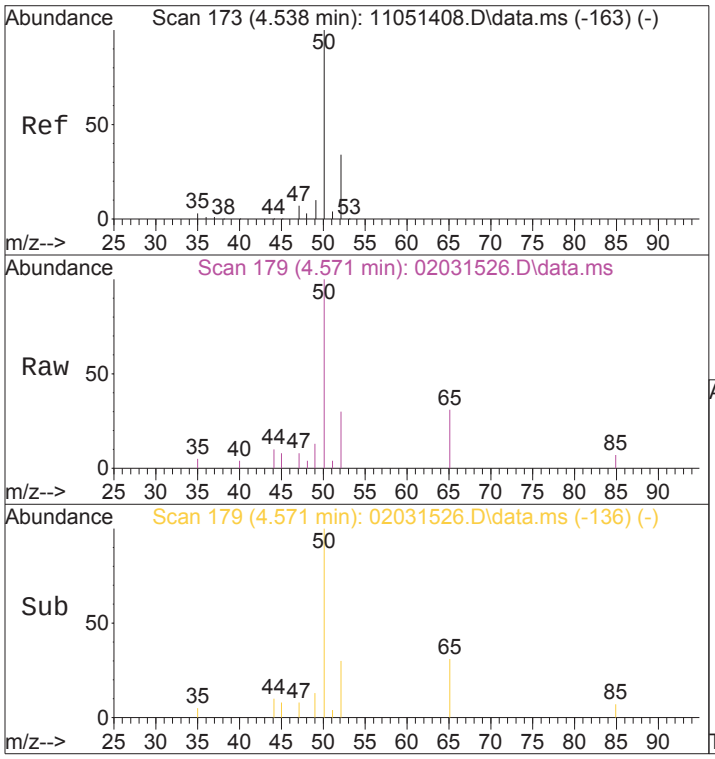


#3
Dichlorodifluoromethane (CFC 12)
Concen: 1.74 ng
RT: 4.27 min Scan# 125
Delta R.T. -0.017 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 85 Resp: 63935

Ion	Ratio	Lower	Upper
85	100		
87	32.7	12.8	52.8
101	8.7	0.0	28.9
103	5.7	0.0	25.8

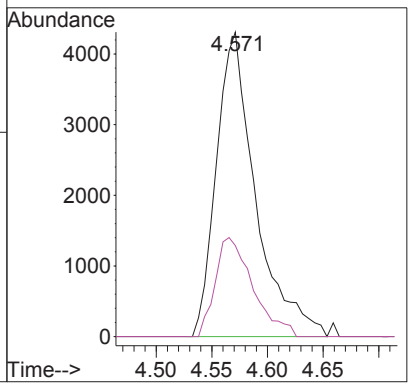


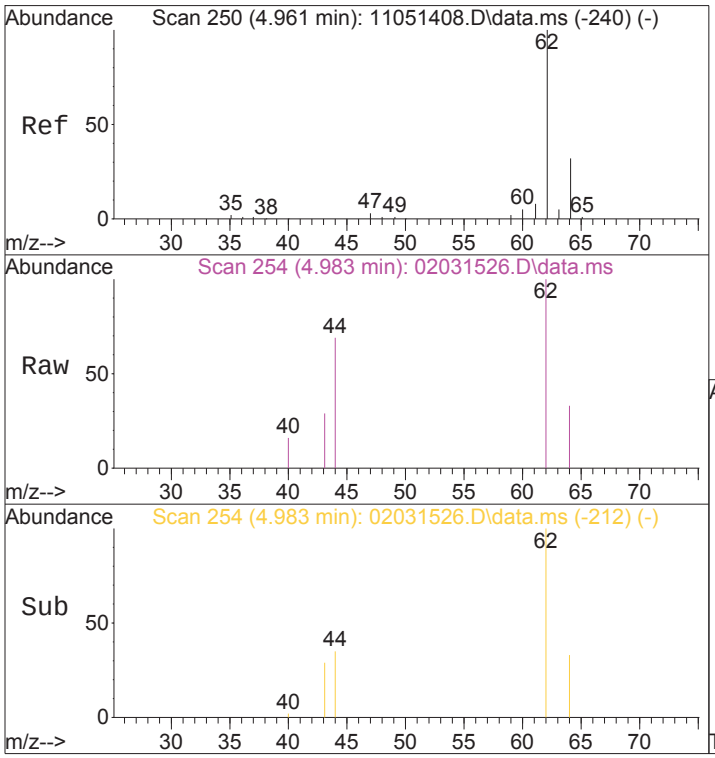


#4
Chloromethane
Concen: 0.43 ng
RT: 4.57 min Scan# 179
Delta R.T. -0.011 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 50 Resp: 10565

Ion	Ratio	Lower	Upper
50	100		
52	31.2	13.3	53.3

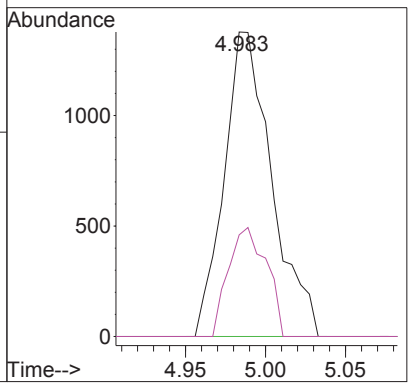


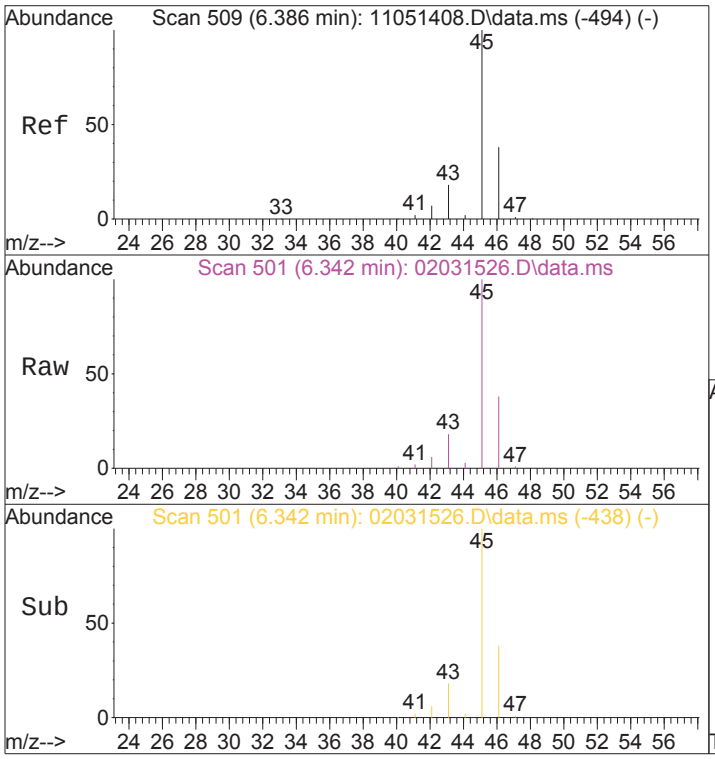


#6
Vinyl Chloride
Concen: 0.11 ng
RT: 4.98 min Scan# 254
Delta R.T. -0.017 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 62 Resp: 2858

Ion	Ratio	Lower	Upper
62	100		
64	28.7	12.3	52.3

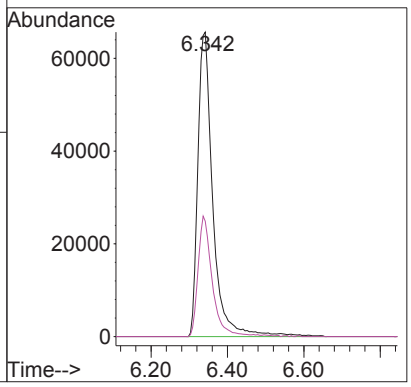


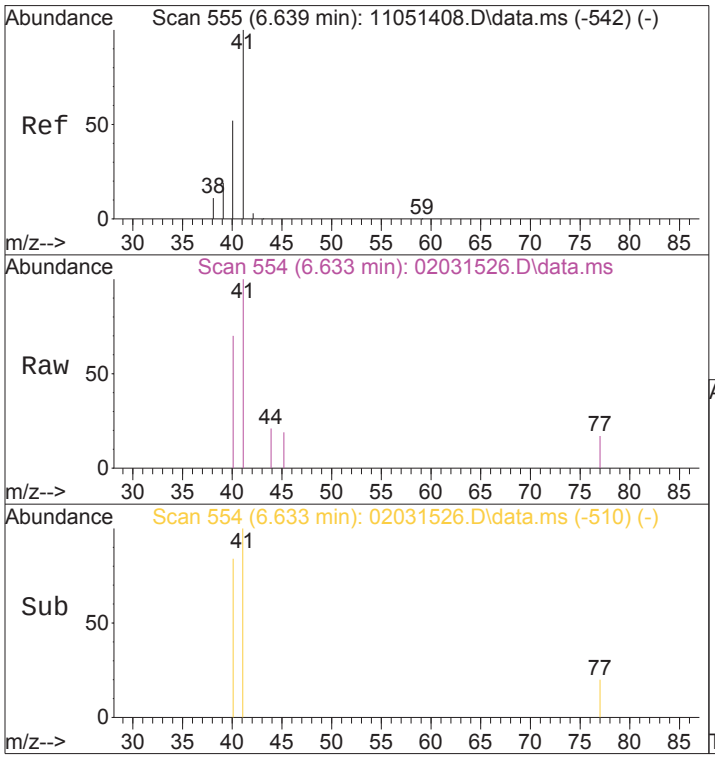


#10
Ethanol
Concen: 15.46 ng
RT: 6.34 min Scan# 501
Delta R.T. -0.005 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 45 Resp: 178901

Ion	Ratio	Lower	Upper
45	100		
46	37.8	17.3	57.3

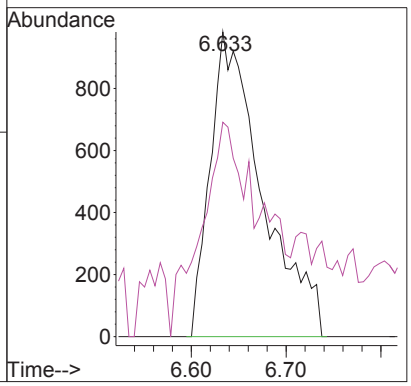


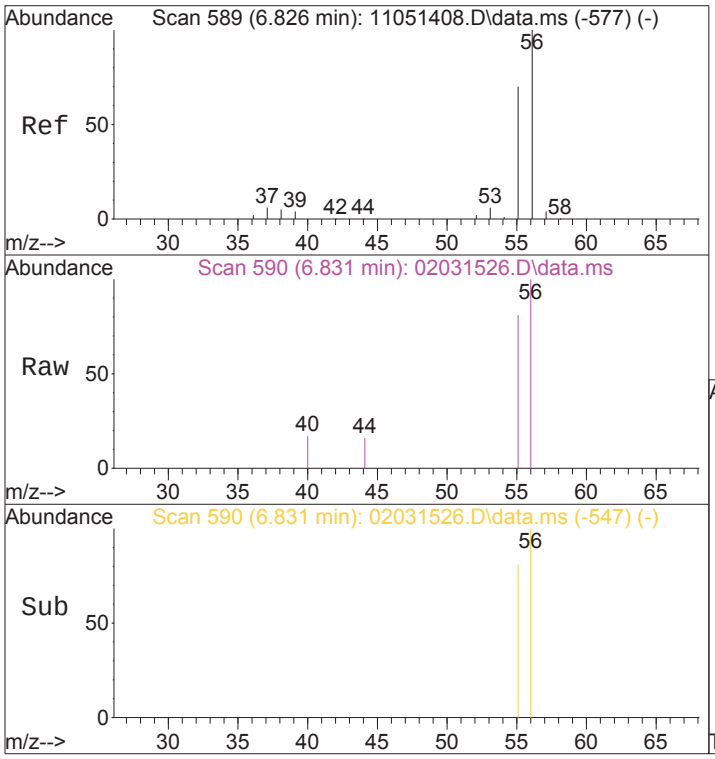


#11
Acetonitrile
Concen: 0.13 ng
RT: 6.63 min Scan# 554
Delta R.T. -0.006 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 41 Resp: 3738

Ion	Ratio	Lower	Upper
41	100		
40	82.1	31.8	71.8#

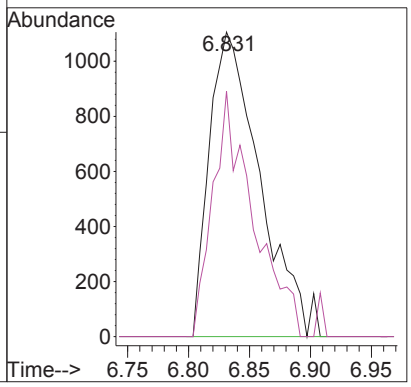


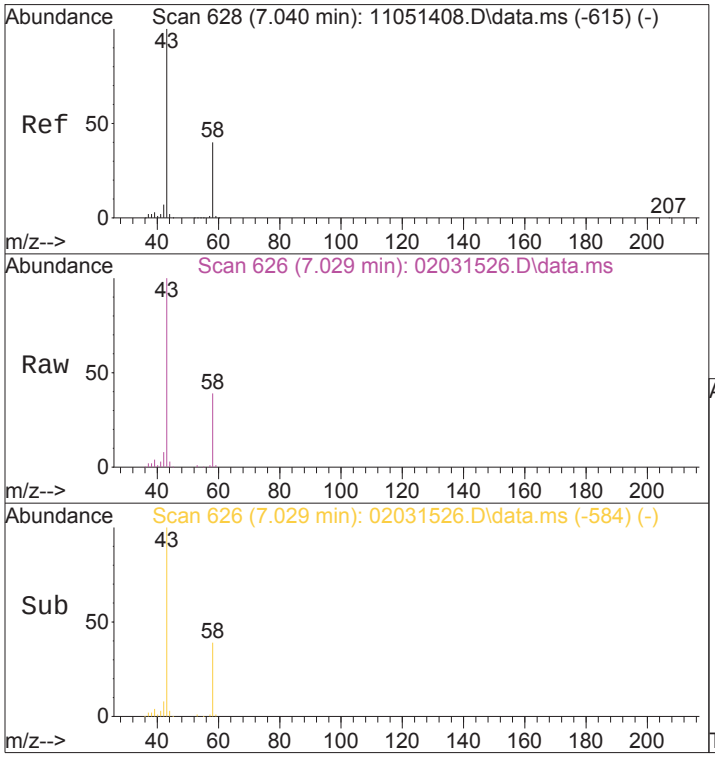


#12
Acrolein
Concen: 0.31 ng
RT: 6.83 min Scan# 590
Delta R.T. -0.011 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 56 Resp: 3198

Ion	Ratio	Lower	Upper
56	100		
55	64.4	48.3	88.3

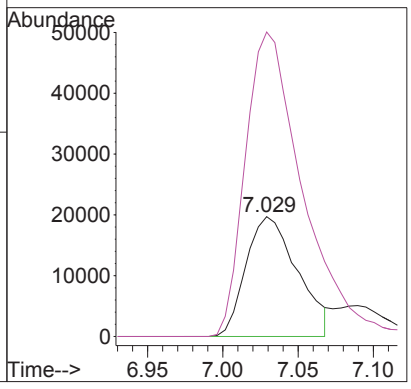


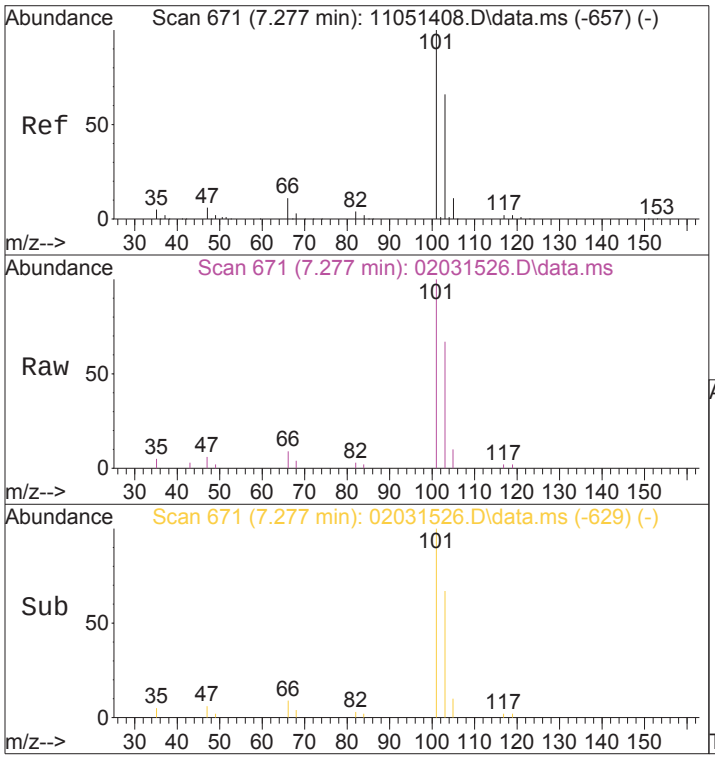


#13
Acetone
Concen: 3.76 ng m
RT: 7.03 min Scan# 626
Delta R.T. -0.017 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 58 Resp: 46922

Ion	Ratio	Lower	Upper
58	100		
43	289.2	220.1	280.1#

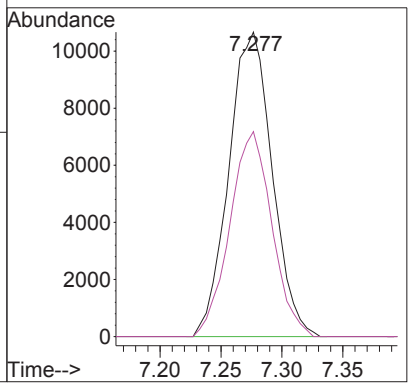


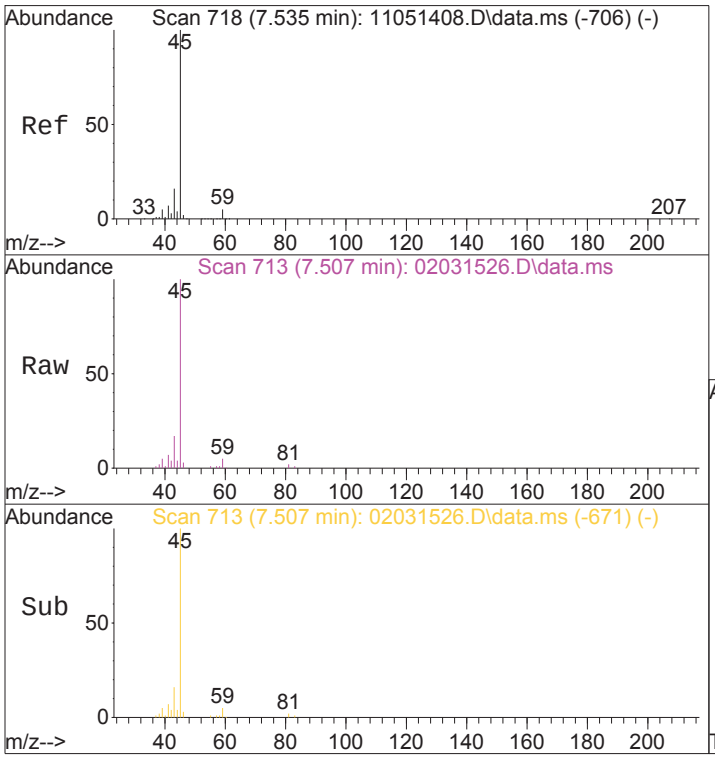


#14
Trichlorofluoromethane
Concen: 0.99 ng
RT: 7.28 min Scan# 671
Delta R.T. -0.017 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion:101 Resp: 26431

Ion	Ratio	Lower	Upper
101	100		
103	65.2	45.4	85.4

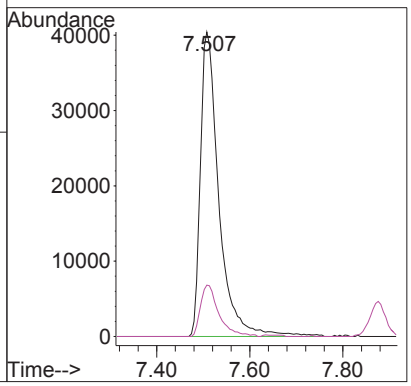


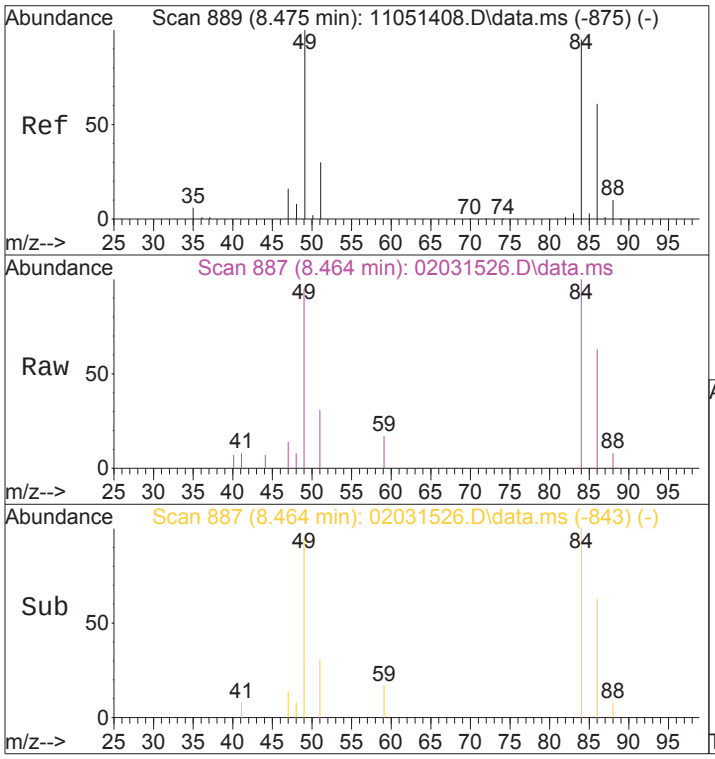


#15
2-Propanol (Isopropanol)
Concen: 2.82 ng
RT: 7.51 min Scan# 713
Delta R.T. -0.017 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 45 Resp: 111500

Ion	Ratio	Lower	Upper
45	100		
43	16.7	0.0	36.1

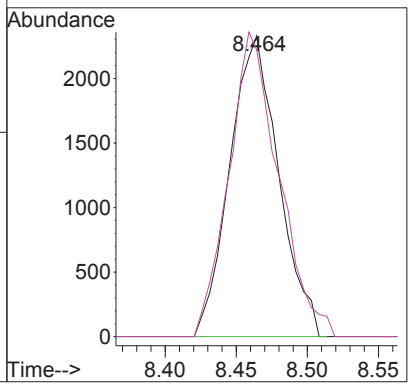


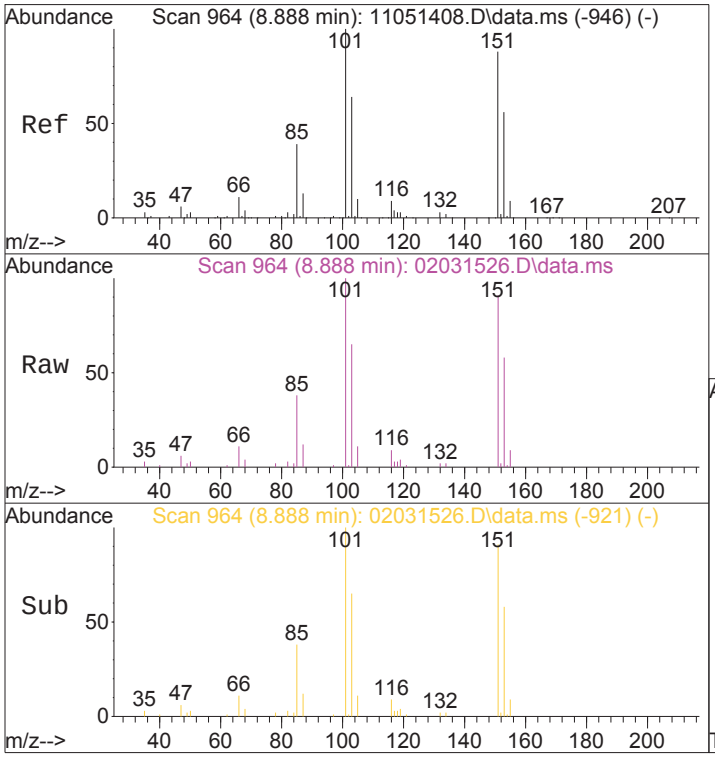


#19
Methylene Chloride
Concen: 0.29 ng
RT: 8.46 min Scan# 887
Delta R.T. -0.006 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 84 Resp: 5575

Ion	Ratio	Lower	Upper
84	100		
49	103.1	75.5	125.5

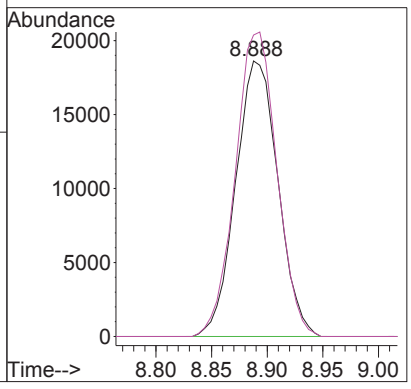


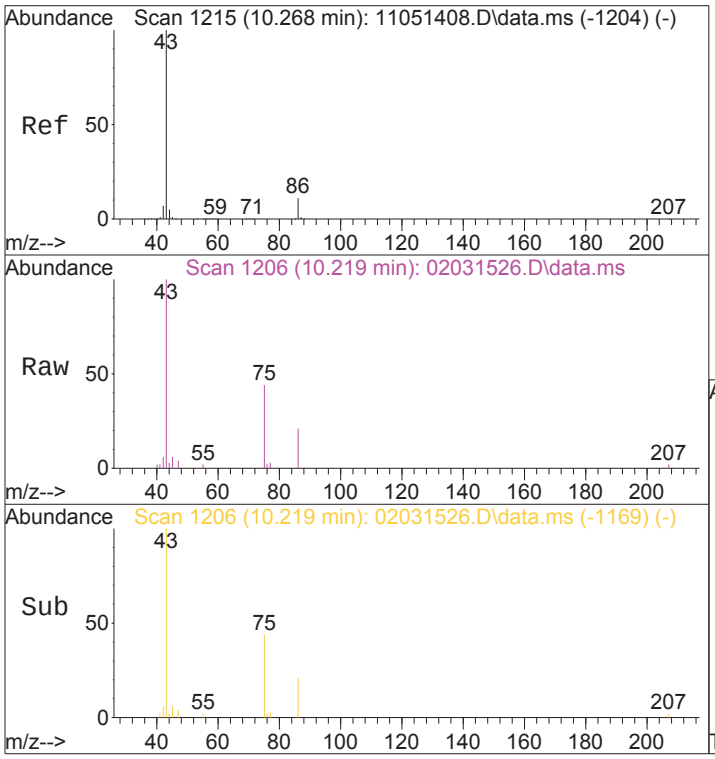


#21
Trichlorotrifluoroethane
Concen: 2.88 ng
RT: 8.89 min Scan# 964
Delta R.T. -0.011 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion:151 Resp: 49284

Ion	Ratio	Lower	Upper
151	100		
101	108.5	89.5	129.5

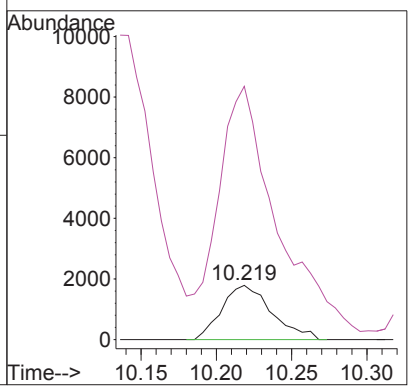


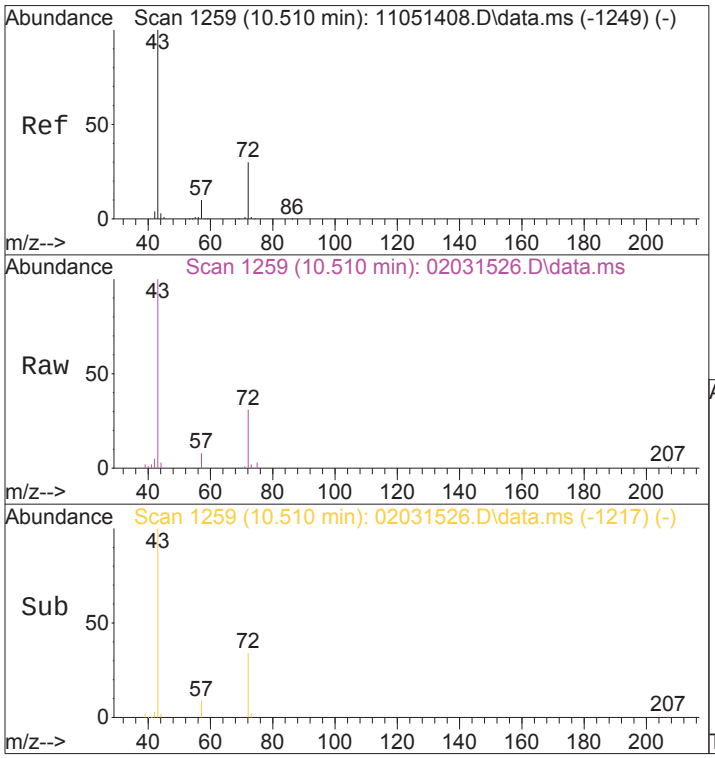


#26
Vinyl Acetate
Concen: 0.97 ng
RT: 10.22 min Scan# 1206
Delta R.T. -0.044 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 86 Resp: 4128

Ion	Ratio	Lower	Upper
86	100		
43	542.6	834.2	874.2#

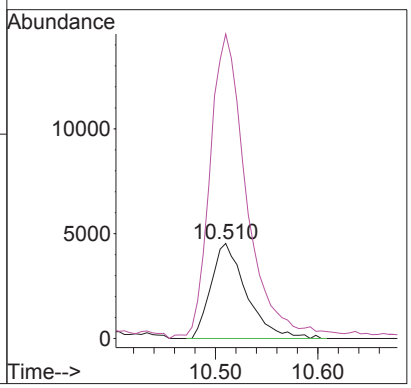


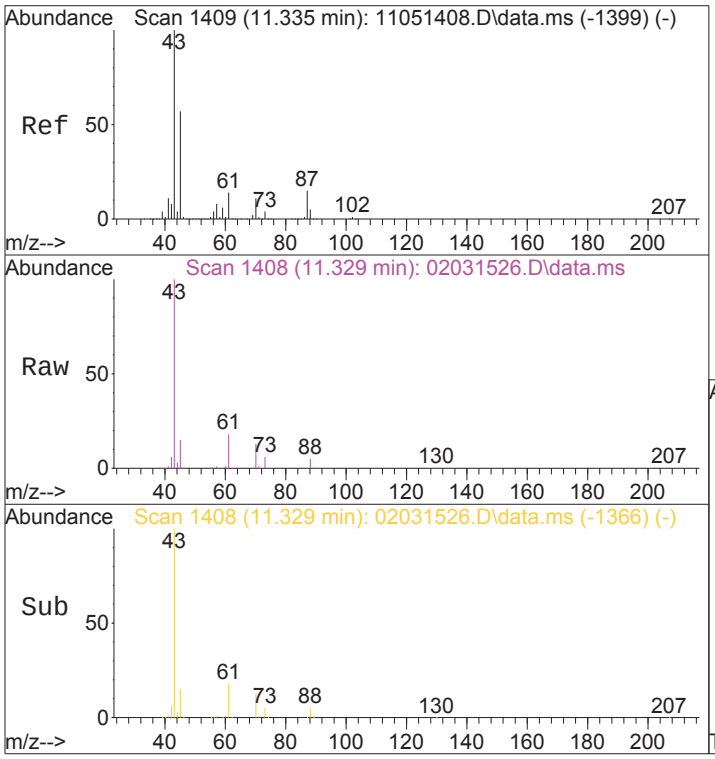


#27
2-Butanone (MEK)
Concen: 0.91 ng
RT: 10.51 min Scan# 1259
Delta R.T. -0.017 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 72 Resp: 10934

Ion	Ratio	Lower	Upper
72	100		
43	341.9	312.1	352.1

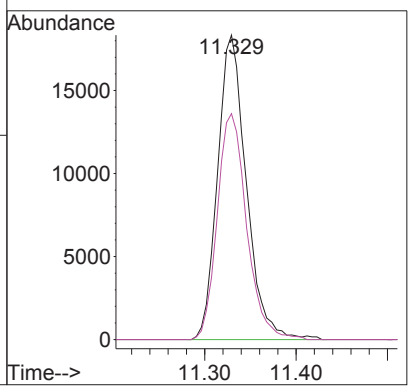


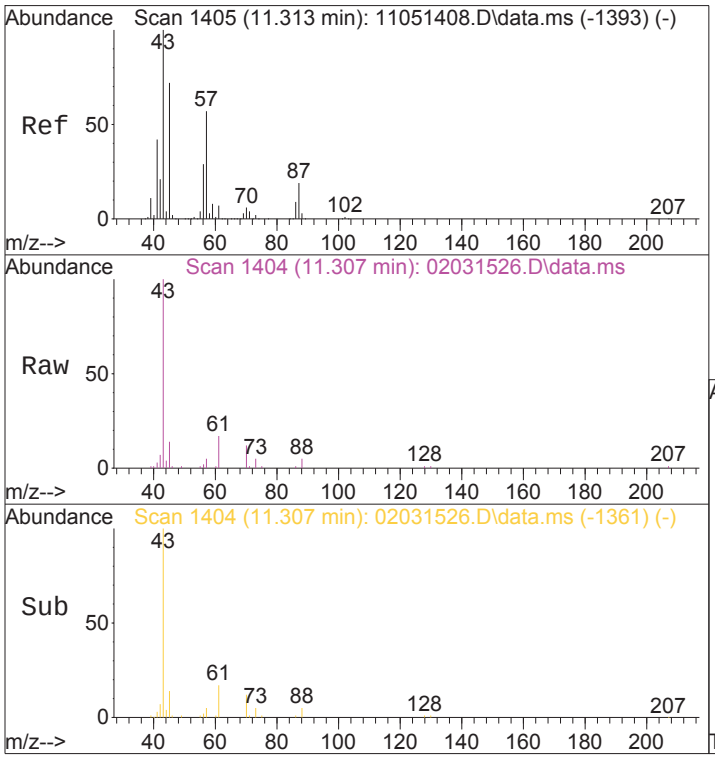


#30
Ethyl Acetate
Concen: 6.58 ng
RT: 11.33 min Scan# 1408
Delta R.T. -0.017 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 61 Resp: 40090

Ion	Ratio	Lower	Upper
61	100		
70	75.8	59.6	99.6

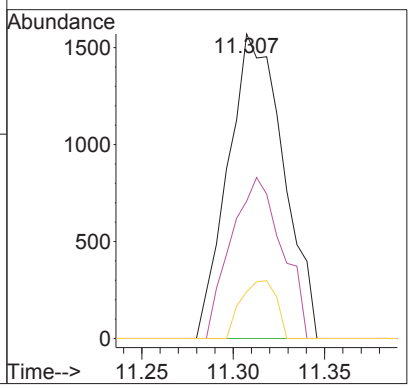


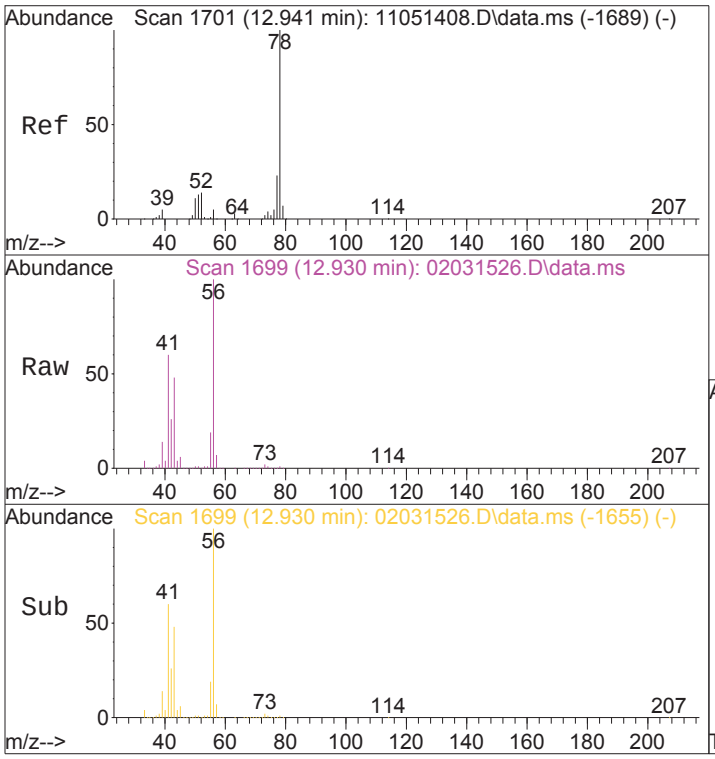


#31
n-Hexane
Concen: 0.14 ng
RT: 11.31 min Scan# 1404
Delta R.T. -0.011 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 57 Resp: 3300

Ion	Ratio	Lower	Upper
57	100		
56	48.8	40.7	61.1
86	0.0	14.0	21.0#

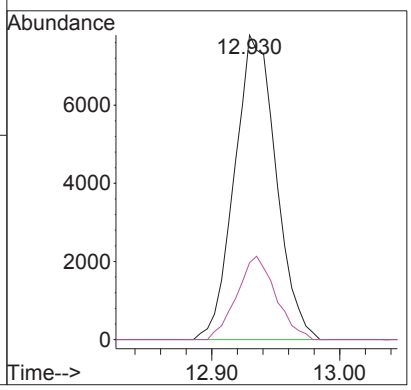


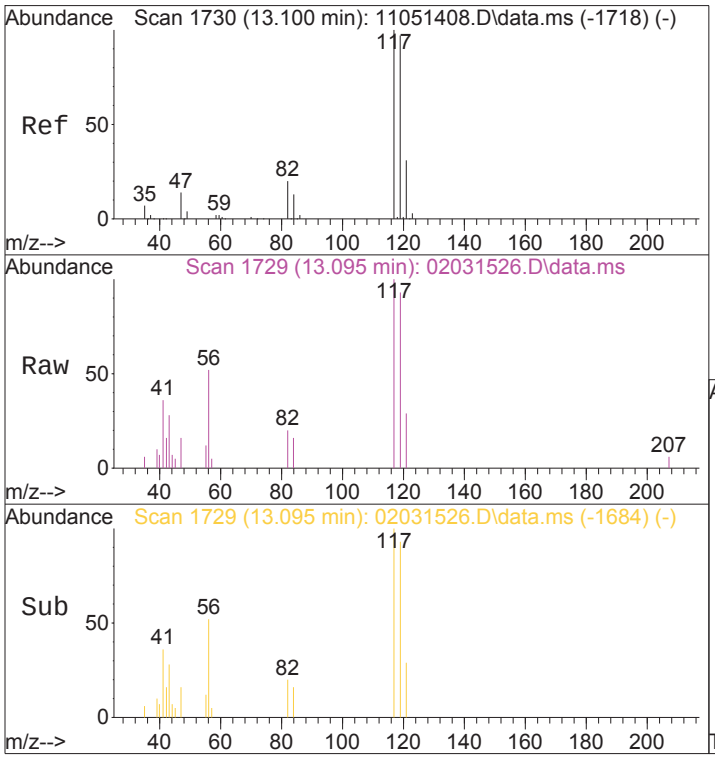


#41
Benzene
Concen: 0.24 ng
RT: 12.93 min Scan# 1699
Delta R.T. -0.006 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 78 Resp: 17581

Ion	Ratio	Lower	Upper
78	100		
77	25.7	2.9	42.9

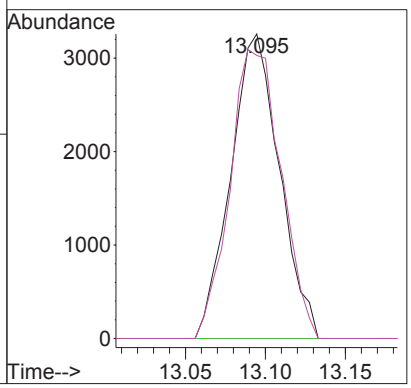


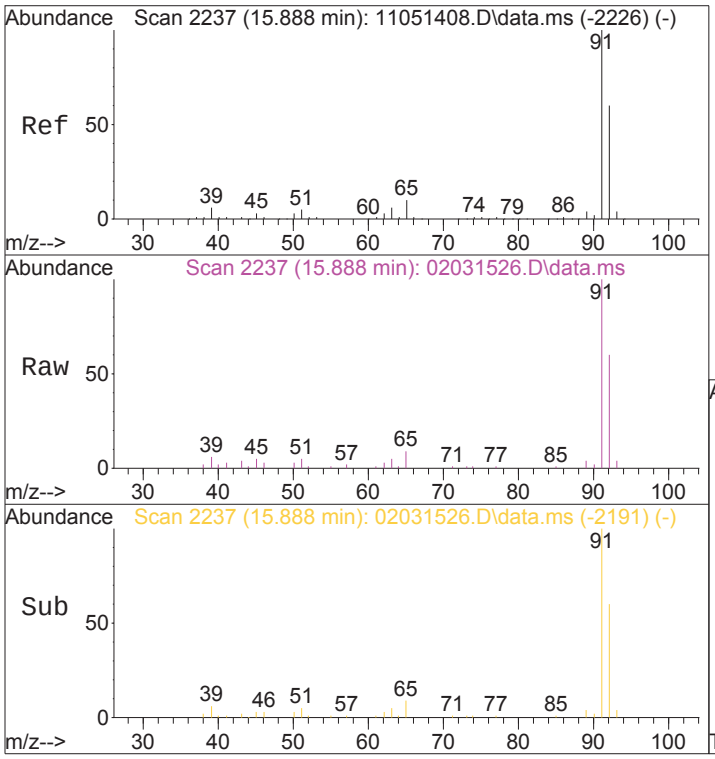


#42
Carbon Tetrachloride
Concen: 0.31 ng
RT: 13.09 min Scan# 1729
Delta R.T. -0.000 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion:117 Resp: 6910

Ion	Ratio	Lower	Upper
117	100		
119	99.7	77.6	117.6

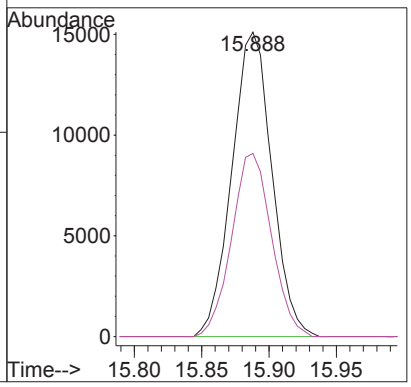


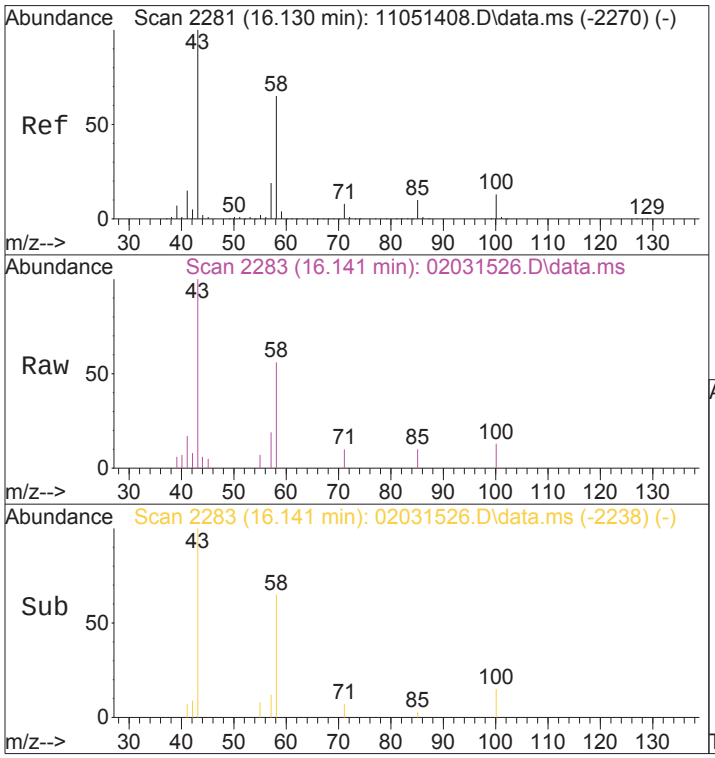


#58
Toluene
Concen: 0.38 ng
RT: 15.89 min Scan# 2237
Delta R.T. 0.005 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 91 Resp: 31205

Ion	Ratio	Lower	Upper
91	100		
92	60.0	40.1	80.1

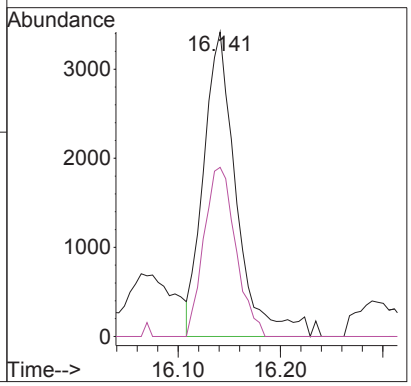


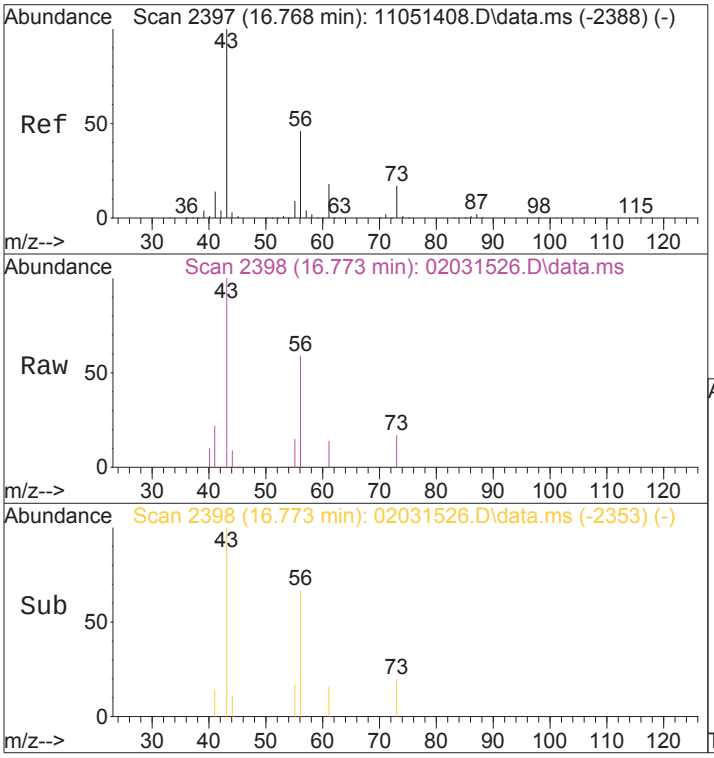


#59
2-Hexanone
Concen: 0.22 ng
RT: 16.14 min Scan# 2283
Delta R.T. -0.000 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 43 Resp: 7636

Ion	Ratio	Lower	Upper
43	100		
58	53.7	46.0	86.0

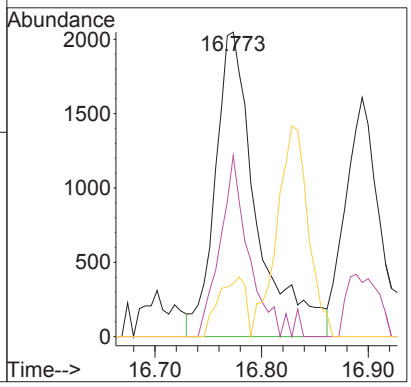


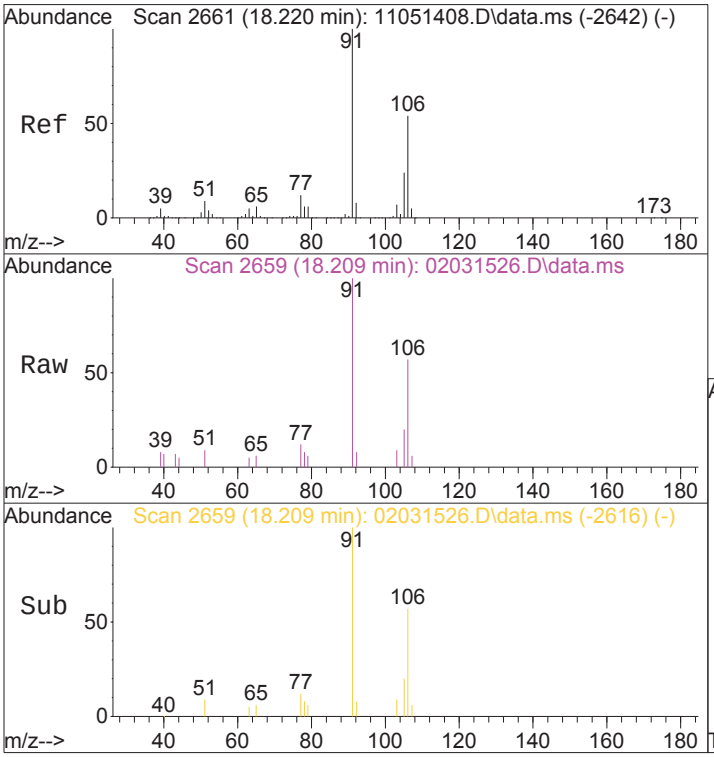


#62
n-Butyl Acetate
Concen: 0.14 ng
RT: 16.77 min Scan# 2398
Delta R.T. -0.001 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 43 Resp: 5513

Ion	Ratio	Lower	Upper
43	100		
56	40.1	26.2	66.2
73	12.7	0.0	38.2

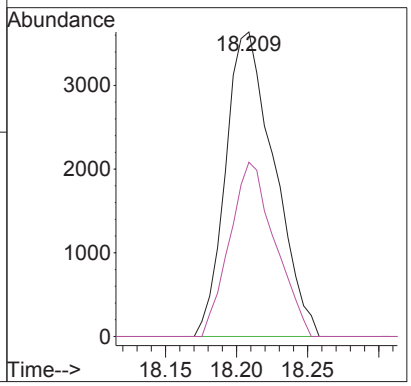


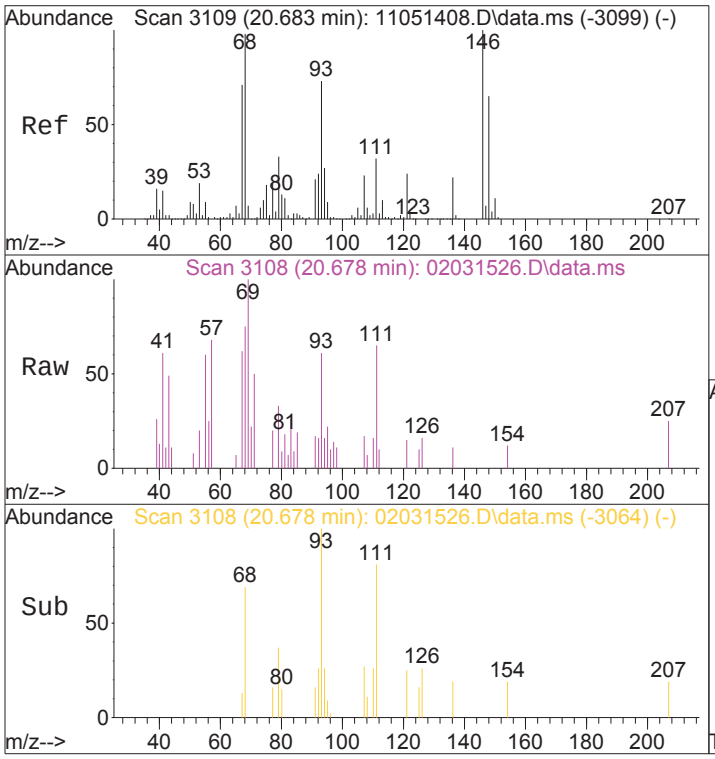


#67
m- p- ylenes
Concen: 0.13 ng
RT: 18.21 min Scan# 2659
Delta R.T. -0.011 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 91 Resp: 8634

Ion	Ratio	Lower	Upper
91	100		
106	53.4	33.3	73.3

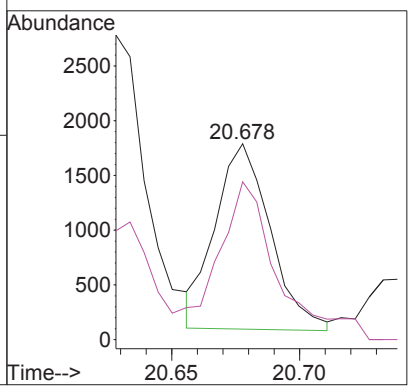




#91
d-Limonene
Concen: 0.10 ng
RT: 20.68 min Scan# 3108
Delta R.T. -0.006 min
Lab File: 02031526.D
Acq: 3 Feb 2015 18:35

Tgt Ion: 68 Resp: 2541

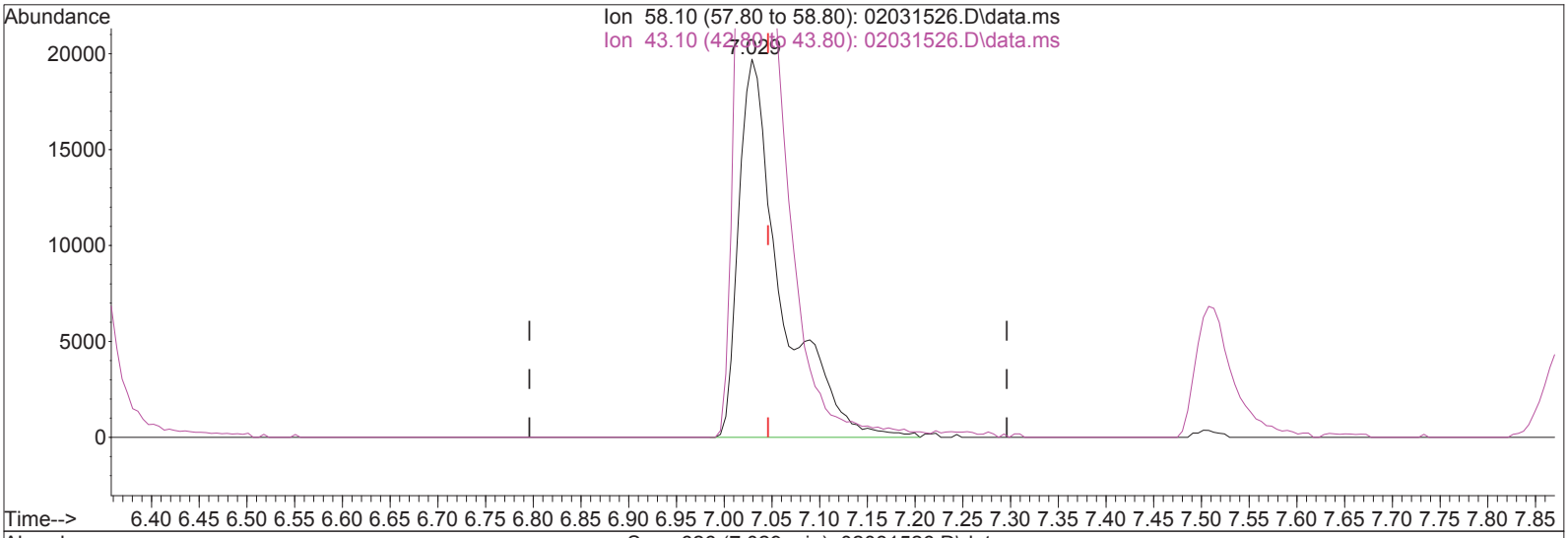
Ion	Ratio	Lower	Upper
68	100		
93	93.7	57.0	97.0

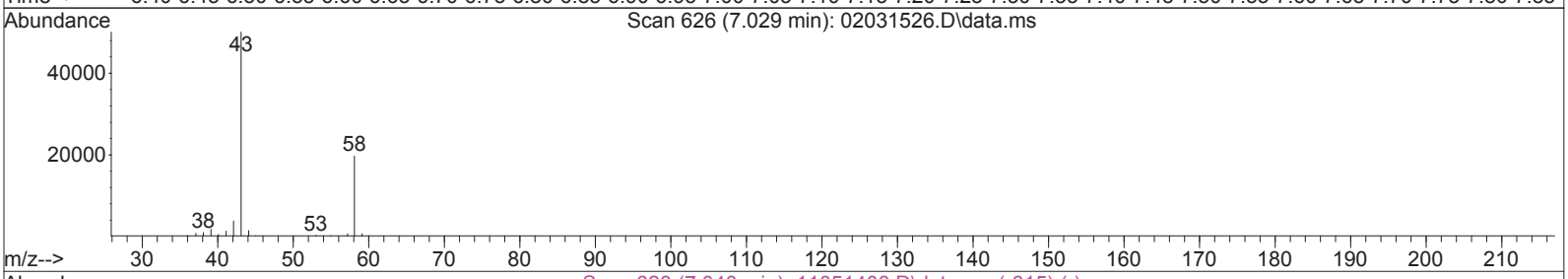


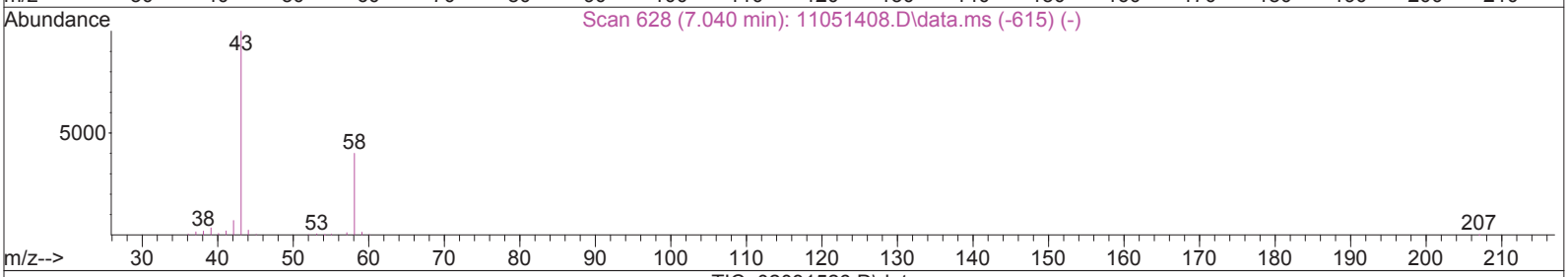
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2015_02\03\02031526.D
Acq On : 3 Feb 2015 18:35 Operator: LH
Sample : P1500308-002 (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 04 07:07:23 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 02031526.D\data.ms

(13) Acetone (T)

7.029min (-0.017) 4.88ng

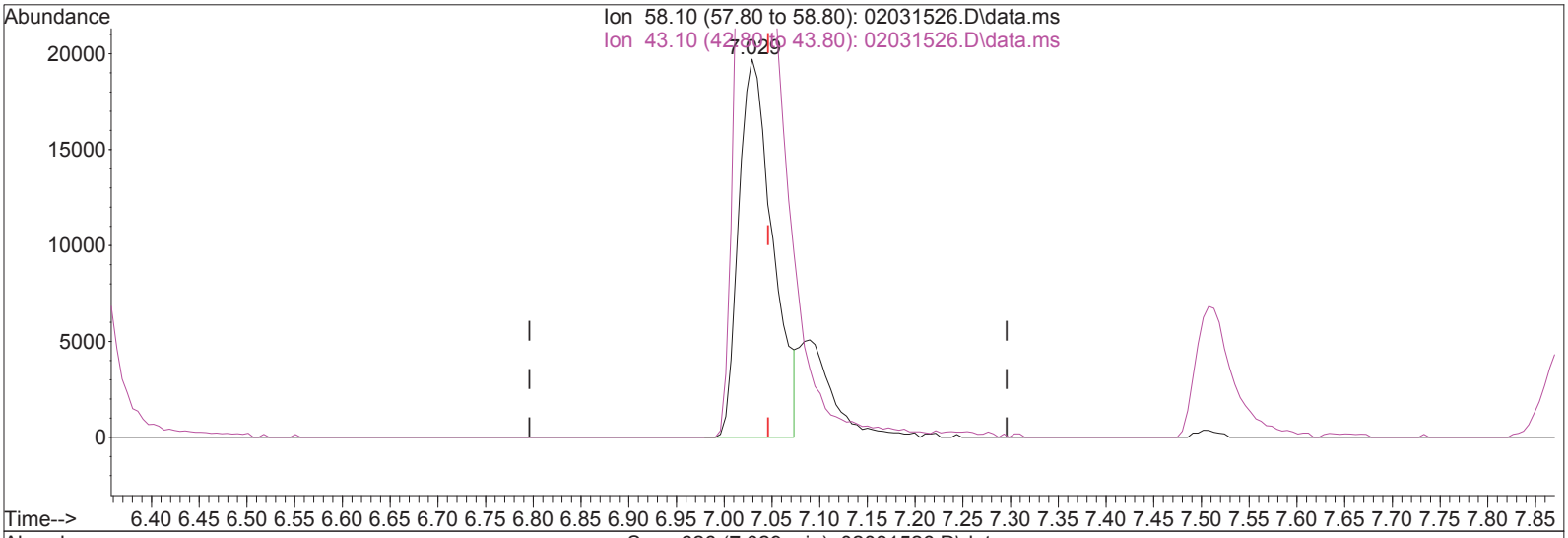
response 61005

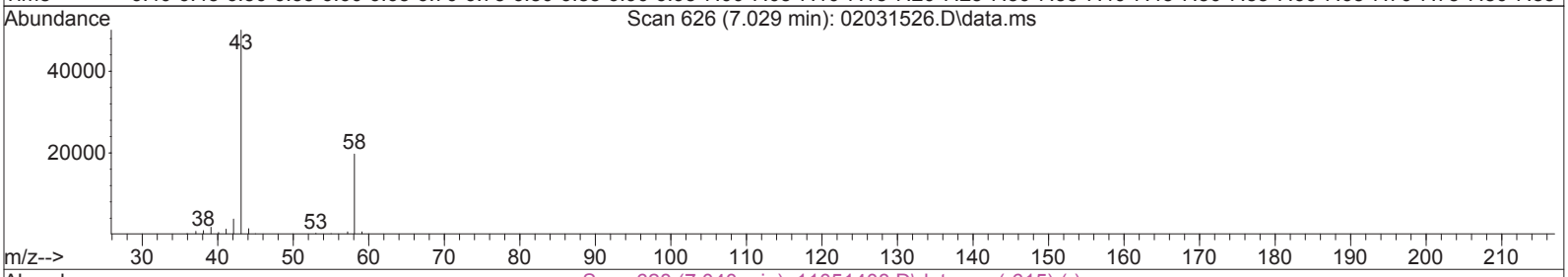
Ion	Exp%	Act%
58.10	100	100
43.10	250.10	222.41
0.00	0.00	0.00
0.00	0.00	0.00

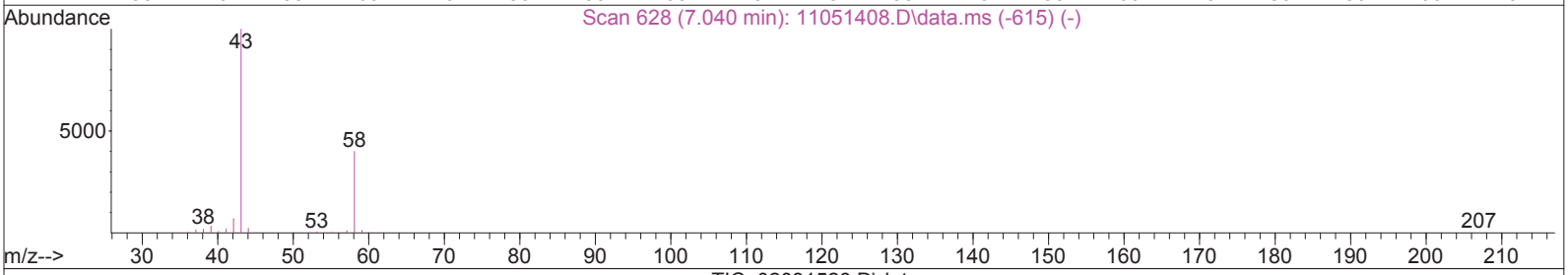
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2015_02\03\02031526.D
Acq On : 3 Feb 2015 18:35 Operator: LH
Sample : P1500308-002 (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 04 07:07:23 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 02031526.D\data.ms

(13) Acetone (T)

7.029min (-0.017) 3.76ng m

response 48428

Ion	Exp%	Act%
58.10	100	100
43.10	250.10	280.17#
0.00	0.00	0.00
0.00	0.00	0.00

IPC

LH 2/6/15

2/6/15

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031526.D
Acq On : 3 Feb 2015 18:35 Operator: LH
Sample : P1500308-002 (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

LH 2/6/15

Quant Time: Feb 06 12:23:11 2015
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : ed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

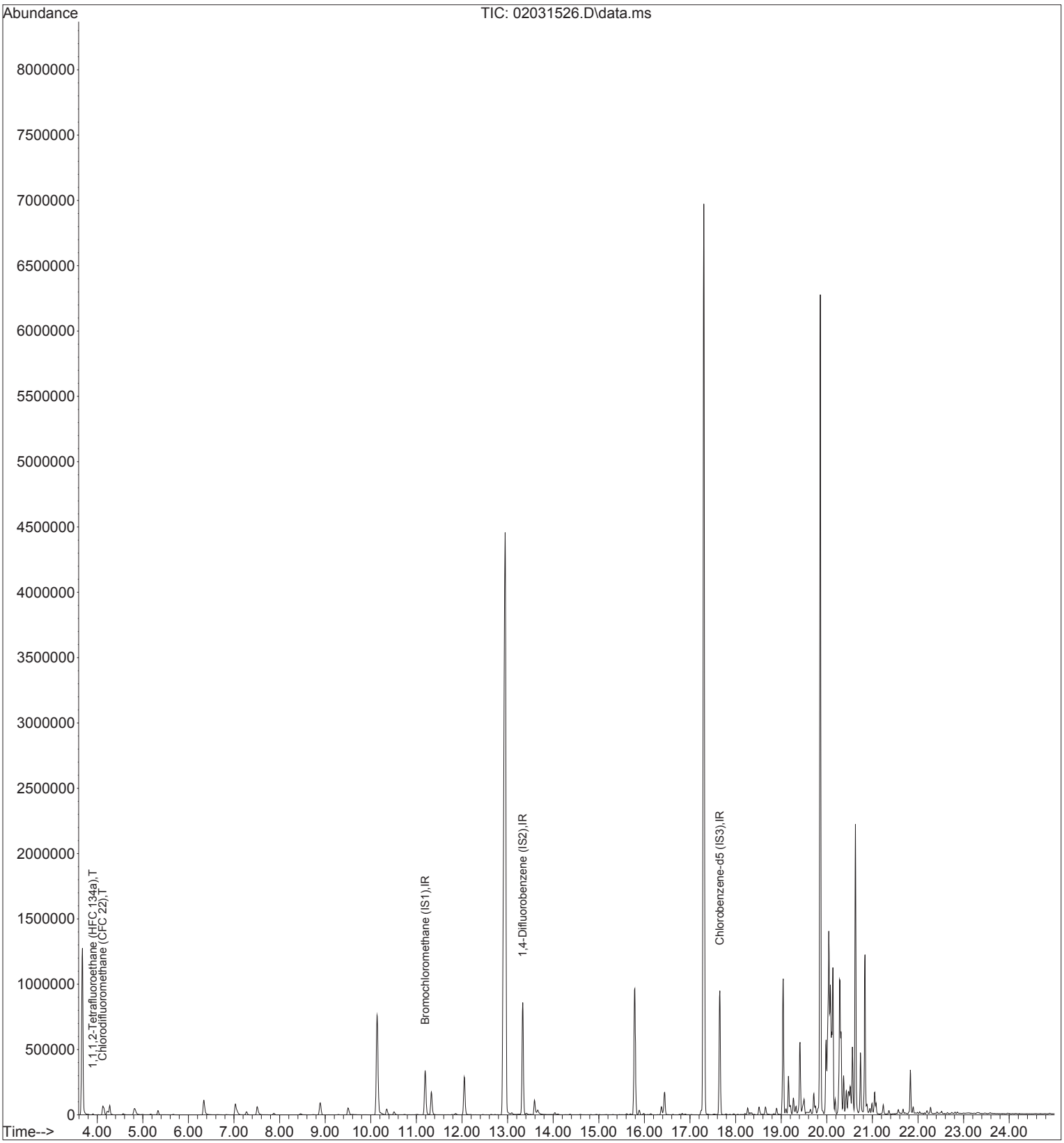
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	186379	12.500	ng	-0.02
16) 1,4-Difluorobenzene (IS2)	13.33	114	916933	12.500	ng	-0.01
19) Chlorobenzene-d5 (IS3)	17.65	82	325155	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.81	85	1087	N.D.		
3) 1,1,1,2-Tetrafluoroeth...	3.91	83	3555	0.238	ng	85
4) 1,1-Difluoroethane	4.02	65	767	N.D.		
5) Chlorodifluoromethane ...	4.12	67	2343	0.561	ng	98
6) 1-Chloro-1,1-Difluoroe...	4.57	65	2064	N.D.		
7) Dichlorofluoromethane ...	6.25	67	238	N.D.		
8) Vinylbromide	0.00	108	0	N.D.		
9) 2,2-Dichloro-1,1,1-tri...	6.99	83	110	N.D.		
10) 2-Methylbutane	0.00	57	0	N.D. d		
11) Methyl Acetate	8.50	43	1673	N.D.		
12) 2-Methylpentane	10.26	71	1619	N.D.		
13) 2,2-Dichloropropane	0.00	77	0	N.D.		
14) 1,1-Dichloropropene	12.80	75	53	N.D.		
15) Thiophene	13.09	84	1465	N.D.		
17) 2,3-Dimethylpentane	13.50	56	1193	N.D.		
18) Dibromomethane	13.74	174	228	N.D.		
20) Methyl Cyclohexane	15.02	55	854	N.D.		
21) 1,3-Dichloropropane	15.88	76	312	N.D.		
22) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.		
23) 1-Chlorohexane	17.87	91	471	N.D.		
24) 1,2,3-Trichloropropane	18.75	75	552	N.D.		
25) Bromobenzene	19.24	77	639	N.D.		
26) 2-Chlorotoluene	19.61	91	3688	N.D.		
27) 4-Chlorotoluene	19.71	91	503	N.D.		
28) Indan	20.73	117	1489	N.D.		
29) Indene	20.81	115	802	N.D.		
30) 1,2,4,5-Tetramethylben...	21.57	119	1660	N.D.		
31) 1,2,3,4-Tetramethylben...	21.61	119	1974	N.D.		
32) 1,2,3,5-Tetramethylben...	21.94	119	1770	N.D.		
33) 1,2,3-Trichlorobenzene	22.52	180	670	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031526.D
Acq On : 3 Feb 2015 18:35 Operator: LH
Sample : P1500308-002 (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:23:11 2015
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : ed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031527.D
Acq On : 3 Feb 2015 19:10 Operator: LH
Sample : P1500308-002 dup (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:25:26 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 2/6/15

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	189063	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.33	114	923895	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	334784	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.06	65	212288	12.983	ng		0.00
Spiked Amount 12.500			Recovery = 103.84%				
57) Toluene-d8 (SS2)	15.78	98	779971	11.869	ng		0.00
Spiked Amount 12.500			Recovery = 94.96%				
73) Bromofluorobenzene (SS3)	19.04	174	420409	13.110	ng		0.00
Spiked Amount 12.500			Recovery = 104.88%				
Target Compounds							Qvalue
2) Propene	4.13	42	25301	1.494	ng	#	77
3) Dichlorodifluoromethan...	4.29	85	65070	1.749	ng		100
4) Chloromethane	4.58	50	8144	0.324	ng		94
5) 1,2-Dichloro-1,1,2,2-t...	4.83	135	1709	N.D.			
6) Vinyl Chloride	4.99	62	2831	0.111	ng		88
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.34	45	170900	14.560	ng		99
11) Acetonitrile	6.65	41	3505	0.120	ng		78
12) Acrolein	6.84	56	3143	0.304	ng		97
13) Acetone	7.03	58	50701m	4.000	ng		
14) Trichlorofluoromethane	7.28	101	27022	0.995	ng		98
15) 2-Propanol (Isopropanol)	7.51	45	103456	2.584	ng		99
16) Acrylonitrile	0.00	53	0	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	8.46	59	2162	N.D.			
19) Methylene Chloride	8.46	84	5727	0.291	ng		98
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.			
21) Trichlorotrifluoroethane	8.89	151	45147	2.602	ng		99
22) Carbon Disulfide	8.74	76	3577	N.D.			
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	10.13	63	745	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.	d		
26) Vinyl Acetate	10.22	86	4100	0.954	ng	#	30
27) 2-Butanone (MEK)	10.51	72	10671	0.877	ng		91
28) cis-1,2-Dichloroethene	11.02	61	1519	N.D.			
29) Diisopropyl Ether	11.33	87	699	N.D.			
30) Ethyl Acetate	11.33	61	40971	6.634	ng		94
31) n-Hexane	11.31	57	3469	0.143	ng	#	86
32) Chloroform	11.36	83	2034	N.D.			
34) Tetrahydrofuran (THF)	11.82	72	620	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	12.18	62	789	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D.	d		
41) Benzene	12.94	78	18314	0.244	ng		99
42) Carbon Tetrachloride	13.09	117	6892	0.308	ng		95
43) Cyclohexane	13.22	84	905	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.	d		
46) Bromodichloromethane	0.00	83	0	N.D.			
47) Trichloroethene	0.00	130	0	N.D.			
48) 1,4-Dioxane	14.04	88	728	N.D.			
49) 2,2,4-Trimethylpentane...	14.10	57	5622	N.D.			

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031527.D
Acq On : 3 Feb 2015 19:10 Operator: LH
Sample : P1500308-002 dup (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:25:26 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

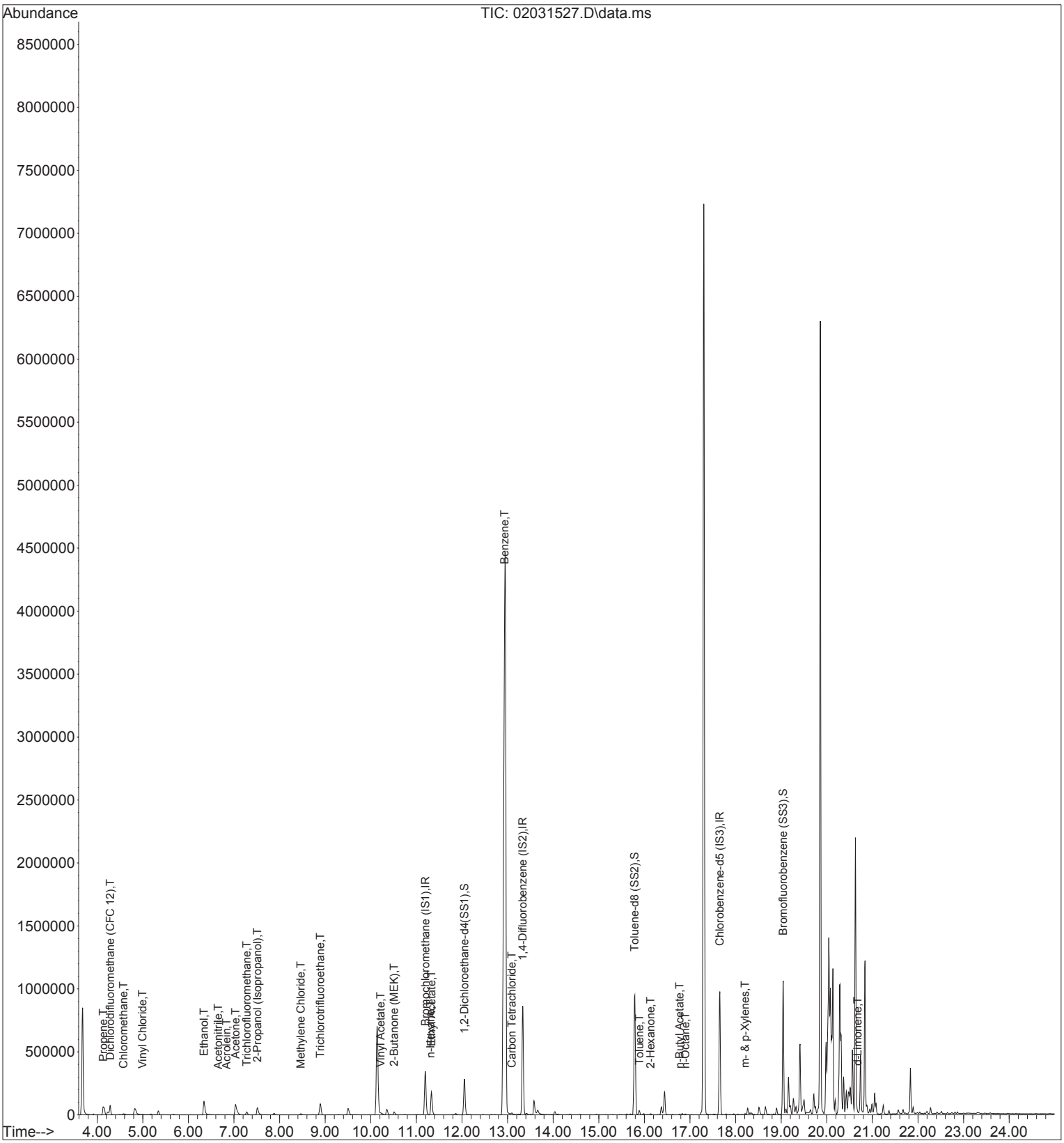
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.	
51) n-Heptane	14.37	71	1046	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	14.95	58	1065	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.89	91	30756	0.360 ng	99
59) 2-Hexanone	16.14	43	7293	0.207 ng	90
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.77	43	5696	0.144 ng	91
63) n-Octane	16.90	57	1287	0.091 ng	87
64) Tetrachloroethene	17.04	166	1028	N.D.	
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	18.05	91	4206	N.D.	
67) m- p- ylenes	18.21	91	8336	0.120 ng	99
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.54	104	1935	N.D.	
70) o- ylene	18.64	91	3856	N.D.	
71) n-Nonane	0.00	43	0	N.D. d	
72) 1,1,2,2-Tetrachloroethane	18.65	83	535	N.D.	
74) Cumene	19.17	105	1288	N.D.	
75) alpha-Pinene	19.52	93	2512	N.D.	
76) n-Propylbenzene	19.62	91	3151	N.D.	
77) 3-Ethyltoluene	19.71	105	3740	N.D.	
78) 4-Ethyltoluene	19.75	105	1624	N.D.	
79) 1,3,5-Trimethylbenzene	19.81	105	1614	N.D.	
80) alpha-Methylstyrene	19.95	118	549	N.D.	
81) 2-Ethyltoluene	19.98	105	1282	N.D.	
82) 1,2,4-Trimethylbenzene	20.17	105	3801	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.29	91	1031	N.D.	
85) 1,3-Dichlorobenzene	20.13	146	894	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	20.55	105	1744	N.D.	
88) 4-Isopropyltoluene (p-...	20.55	119	2668	N.D.	
89) 1,2,3-Trimethylbenzene	20.55	105	1744	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.68	68	2503	0.098 ng	99
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	0.00	57	0	N.D. d	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.29	128	1826	N.D.	
96) n-Dodecane	0.00	57	0	N.D. d	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D. d	
99) tert-Butylbenzene	0.00	119	0	N.D. d	
100) n-Butylbenzene	20.90	91	1959	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031527.D
Acq On : 3 Feb 2015 19:10 Operator: LH
Sample : P1500308-002 dup (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:25:26 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031527.D
Acq On : 3 Feb 2015 19:10 Operator: LH
Sample : P1500308-002 dup (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:25:26 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 2/6/15

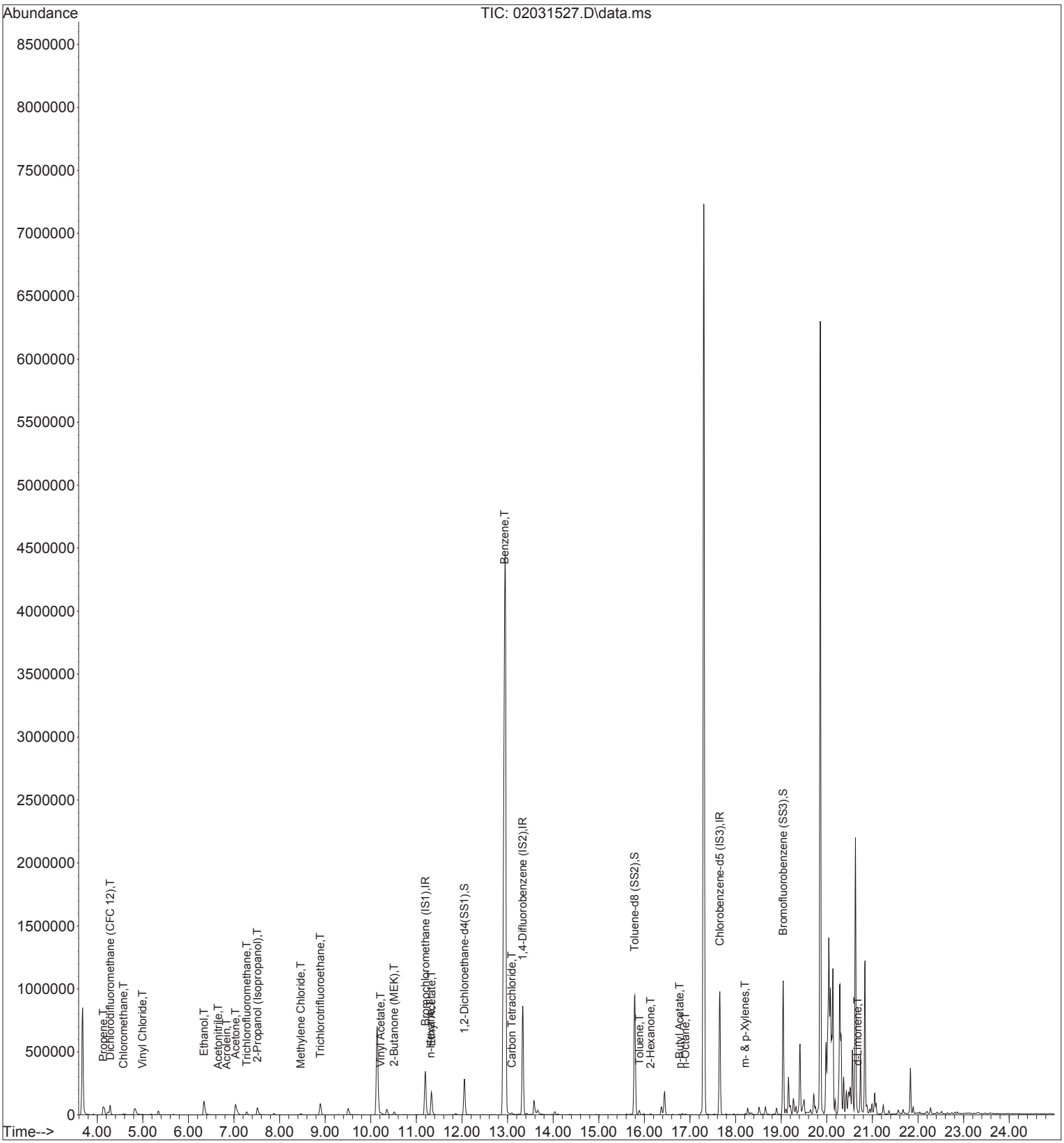
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	189063	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.33	114	923895	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	334784	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.06	65	212288	12.983	ng		0.00
Spiked Amount 12.500			Recovery = 103.84%				
57) Toluene-d8 (SS2)	15.78	98	779971	11.869	ng		0.00
Spiked Amount 12.500			Recovery = 94.96%				
73) Bromofluorobenzene (SS3)	19.04	174	420409	13.110	ng		0.00
Spiked Amount 12.500			Recovery = 104.88%				
Target Compounds							Qvalue
2) Propene	4.13	42	25301	1.494	ng	#	77
3) Dichlorodifluoromethan...	4.29	85	65070	1.749	ng		100
4) Chloromethane	4.58	50	8144	0.324	ng		94
6) Vinyl Chloride	4.99	62	2831	0.111	ng		88
10) Ethanol	6.34	45	170900	14.560	ng		99
11) Acetonitrile	6.65	41	3505	0.120	ng		78
12) Acrolein	6.84	56	3143	0.304	ng		97
13) Acetone	7.03	58	50701m	4.000	ng		
14) Trichlorofluoromethane	7.28	101	27022	0.995	ng		98
15) 2-Propanol (Isopropanol)	7.51	45	103456	2.584	ng		99
19) Methylene Chloride	8.46	84	5727	0.291	ng		98
21) Trichlorotrifluoroethane	8.89	151	45147	2.602	ng		99
26) Vinyl Acetate	10.22	86	4100	0.954	ng	#	30
27) 2-Butanone (MEK)	10.51	72	10671	0.877	ng		91
30) Ethyl Acetate	11.33	61	40971	6.634	ng		94
31) n-Hexane	11.31	57	3469	0.143	ng	#	86
41) Benzene	12.94	78	18314	0.244	ng		99
42) Carbon Tetrachloride	13.09	117	6892	0.308	ng		95
58) Toluene	15.89	91	30756	0.360	ng		99
59) 2-Hexanone	16.14	43	7293	0.207	ng		90
62) n-Butyl Acetate	16.77	43	5696	0.144	ng		91
63) n-Octane	16.90	57	1287	0.091	ng		87
67) m- p- ylenes	18.21	91	8336	0.120	ng		99
91) d-Limonene	20.68	68	2503	0.098	ng		99

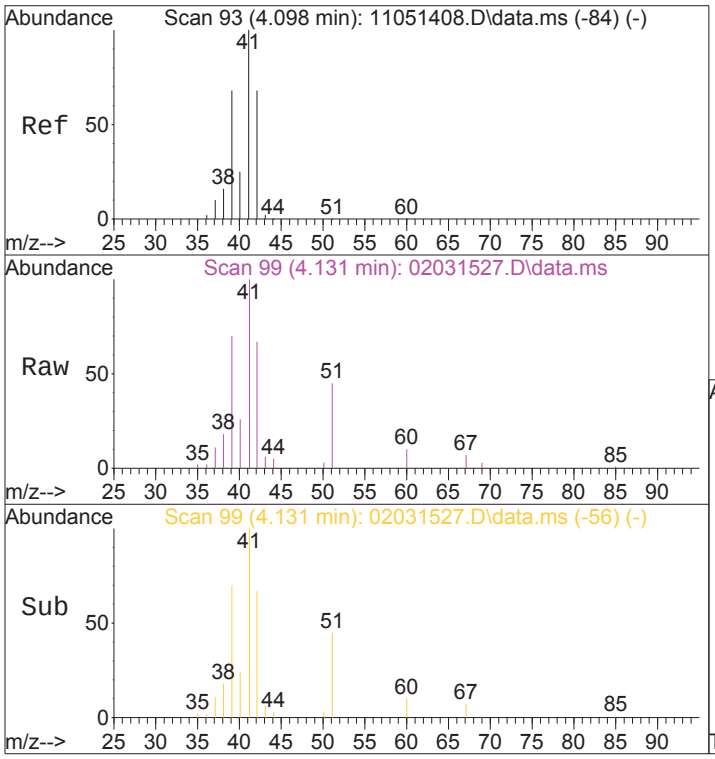
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031527.D
Acq On : 3 Feb 2015 19:10 Operator: LH
Sample : P1500308-002 dup (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:25:26 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

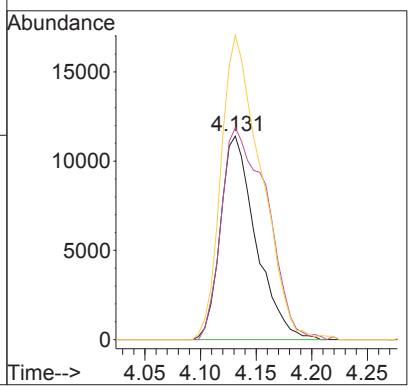


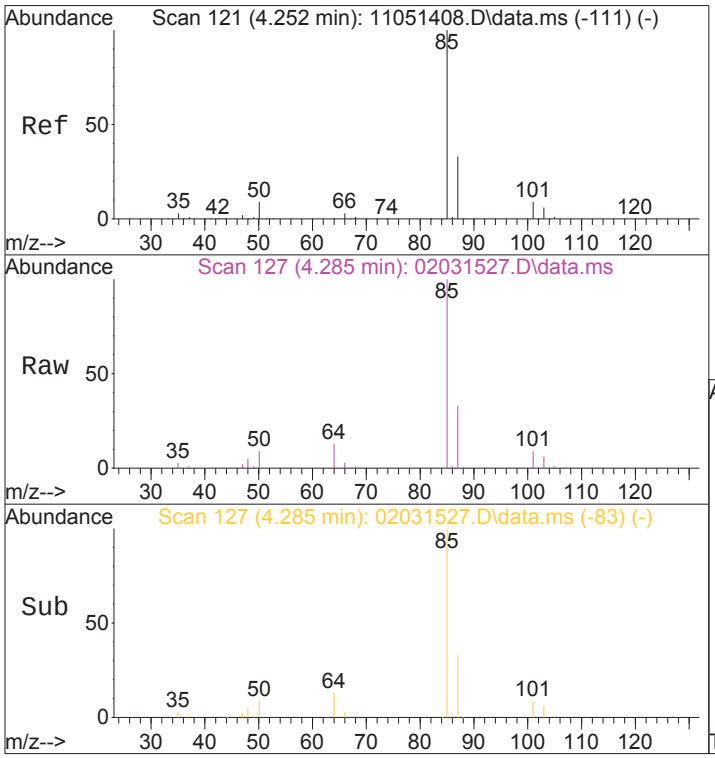


#2
Propene
Concen: 1.49 ng
RT: 4.13 min Scan# 99
Delta R.T. -0.011 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 42 Resp: 25301

Ion	Ratio	Lower	Upper
42	100		
39	135.0	81.4	121.4#
41	169.1	129.3	169.3

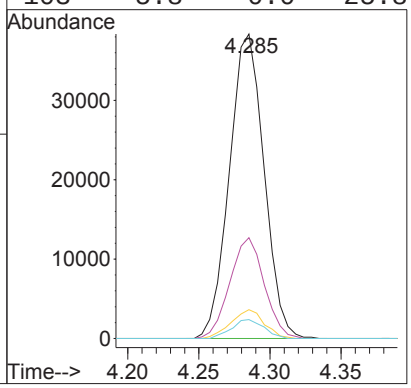


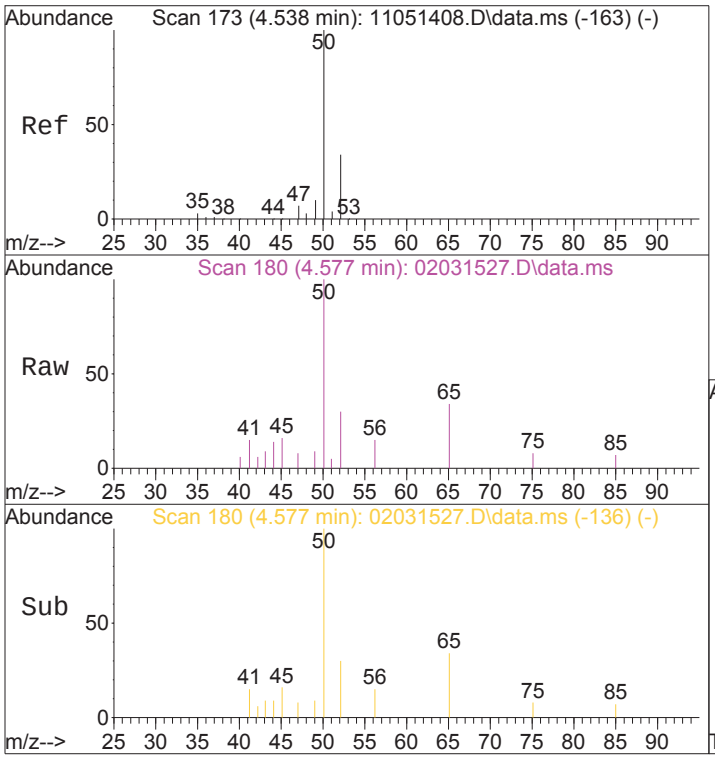


#3
Dichlorodifluoromethane (CFC 12)
Concen: 1.75 ng
RT: 4.29 min Scan# 127
Delta R.T. -0.006 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 85 Resp: 65070

Ion	Ratio	Lower	Upper
85	100		
87	32.8	12.8	52.8
101	9.0	0.0	28.9
103	5.8	0.0	25.8

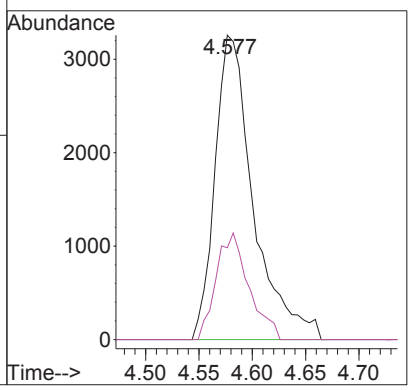


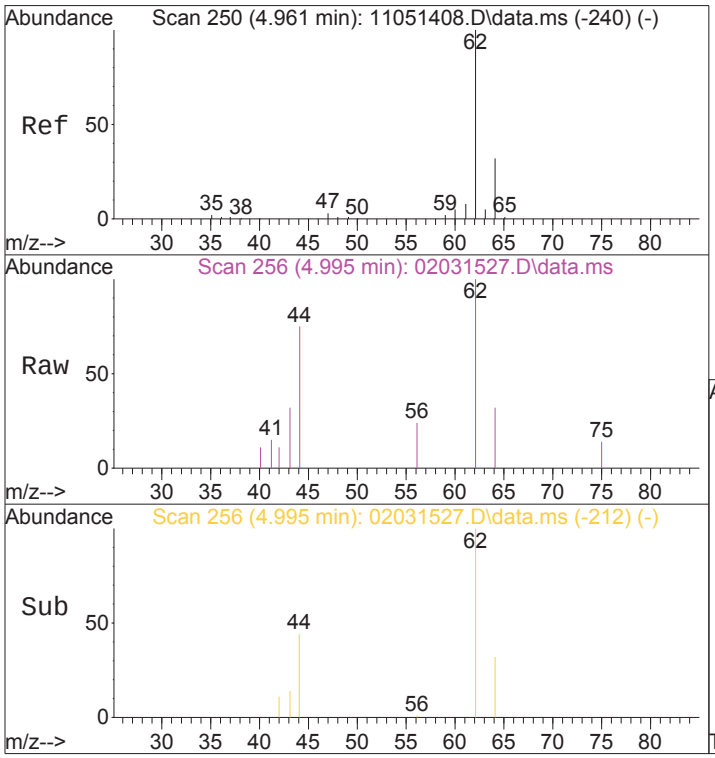


#4
Chloromethane
Concen: 0.32 ng
RT: 4.58 min Scan# 180
Delta R.T. -0.006 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 50 Resp: 8144

Ion	Ratio	Lower	Upper
50	100		
52	29.8	13.3	53.3

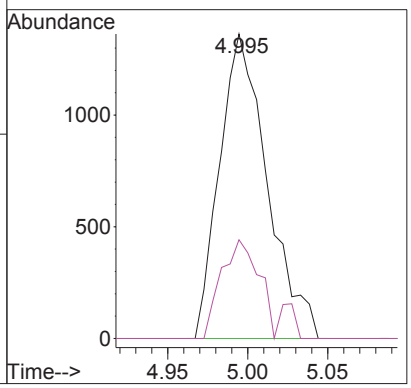


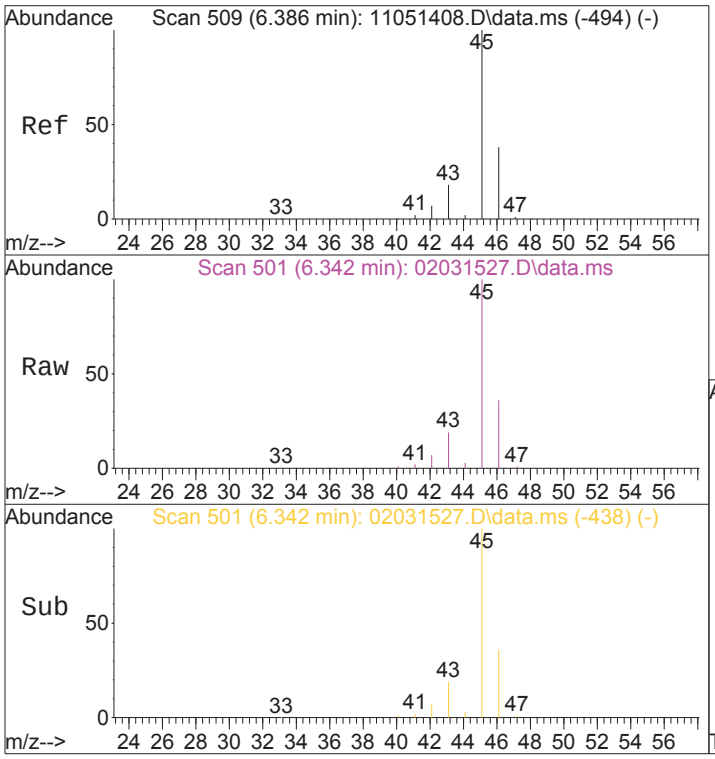


#6
Vinyl Chloride
Concen: 0.11 ng
RT: 4.99 min Scan# 256
Delta R.T. -0.006 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 62 Resp: 2831

Ion	Ratio	Lower	Upper
62	100		
64	25.6	12.3	52.3

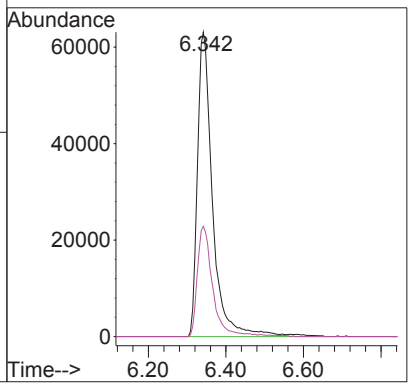


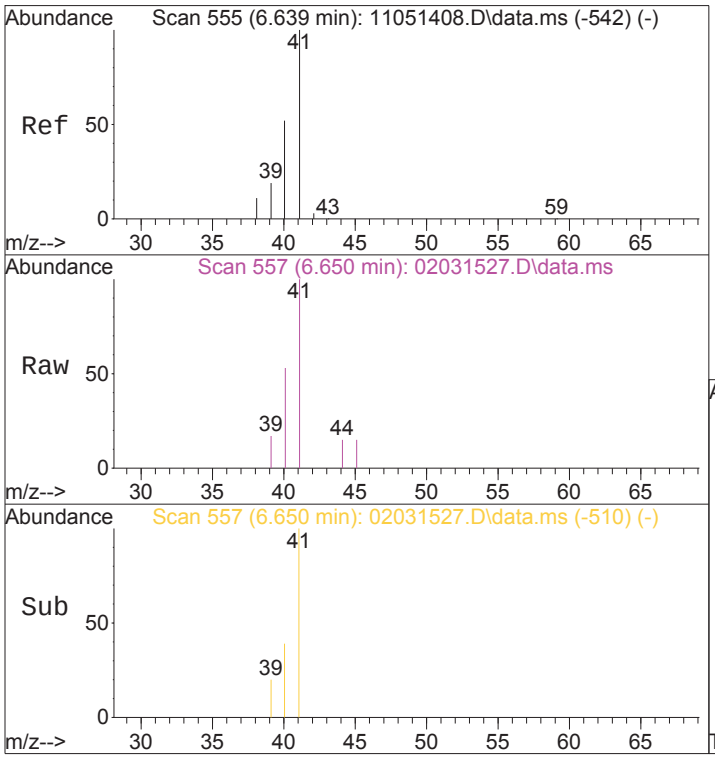


#10
Ethanol
Concen: 14.56 ng
RT: 6.34 min Scan# 501
Delta R.T. -0.005 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 45 Resp: 170900

Ion	Ratio	Lower	Upper
45	100		
46	37.0	17.3	57.3

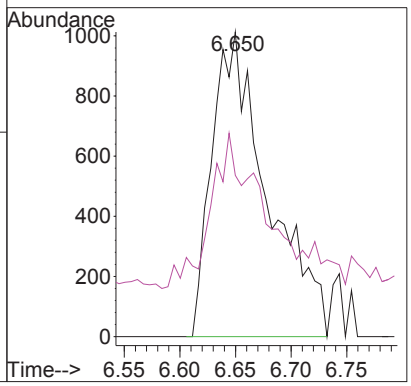


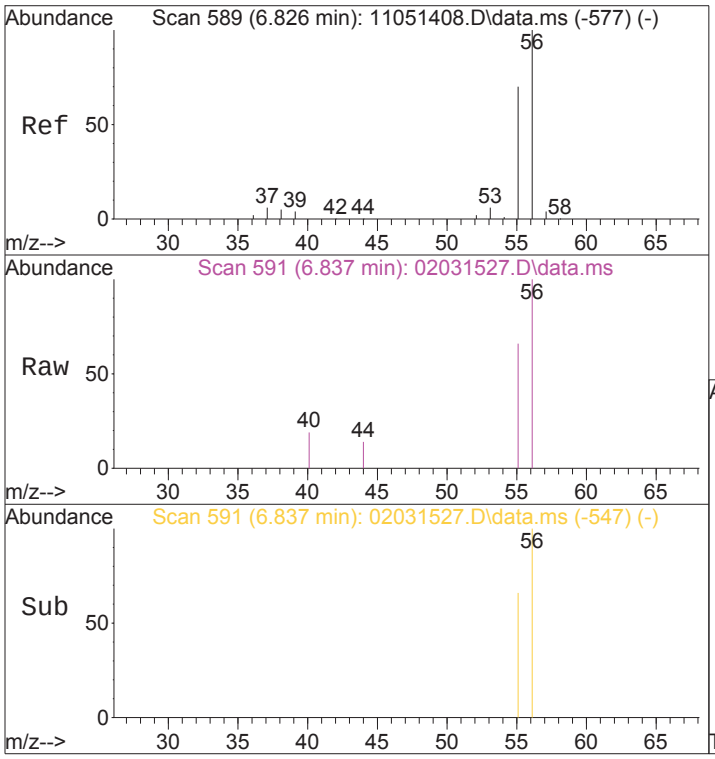


#11
Acetonitrile
Concen: 0.12 ng
RT: 6.65 min Scan# 557
Delta R.T. 0.011 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 41 Resp: 3505

Ion	Ratio	Lower	Upper
41	100		
40	67.4	31.8	71.8

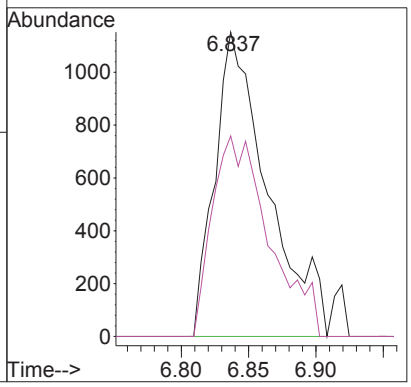


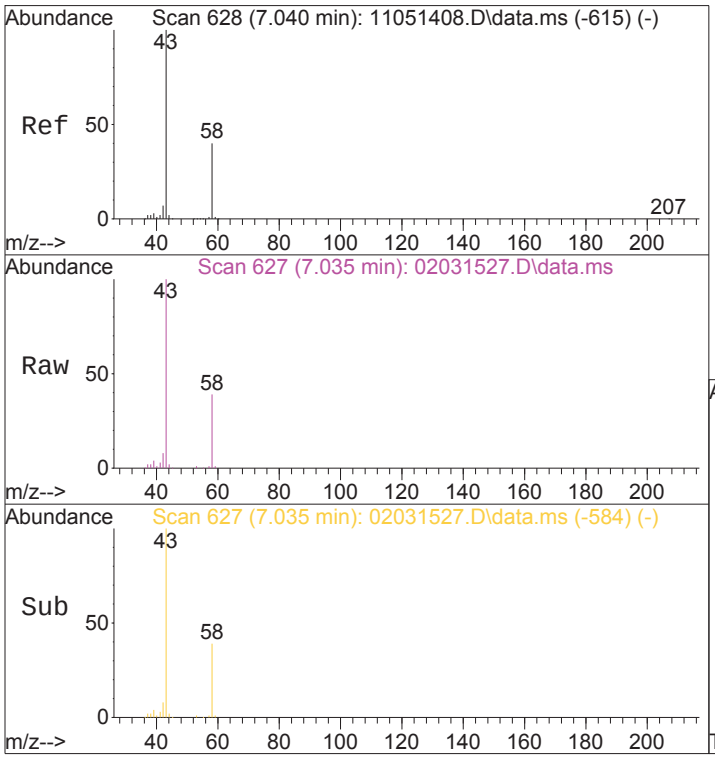


#12
Acrolein
Concen: 0.30 ng
RT: 6.84 min Scan# 591
Delta R.T. -0.005 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 56 Resp: 3143

Ion	Ratio	Lower	Upper
56	100		
55	71.0	48.3	88.3

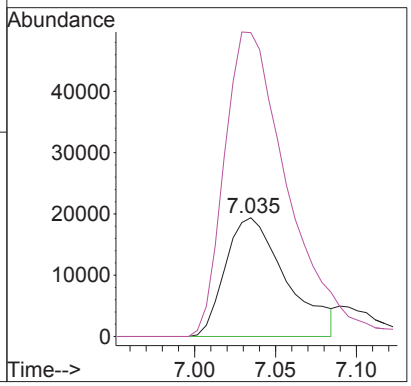


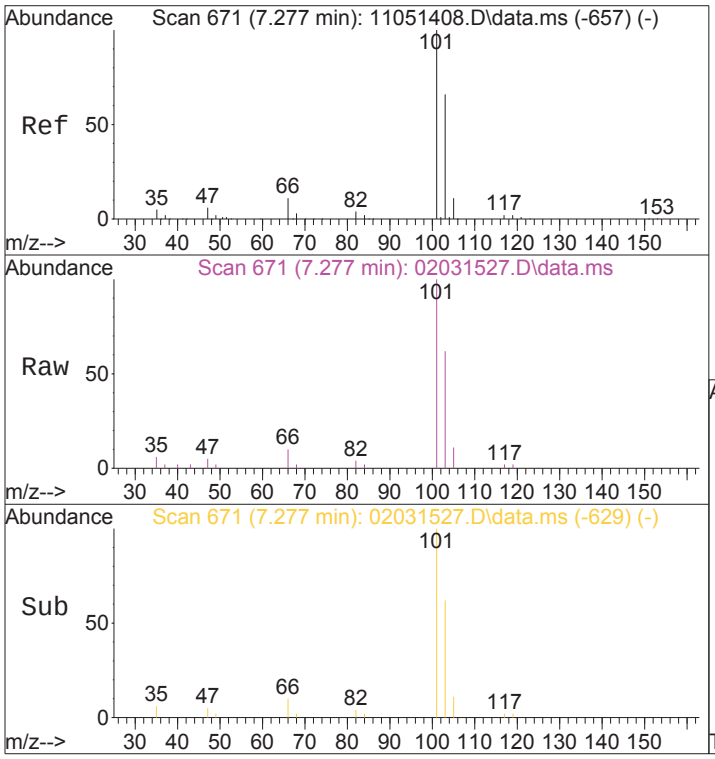


#13
Acetone
Concen: 4.00 ng m
RT: 7.03 min Scan# 627
Delta R.T. -0.011 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 58 Resp: 50701

Ion	Ratio	Lower	Upper
58	100		
43	276.0	220.1	280.1

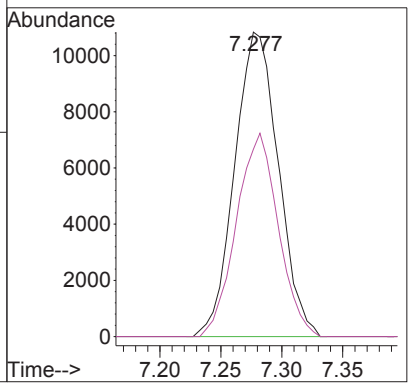


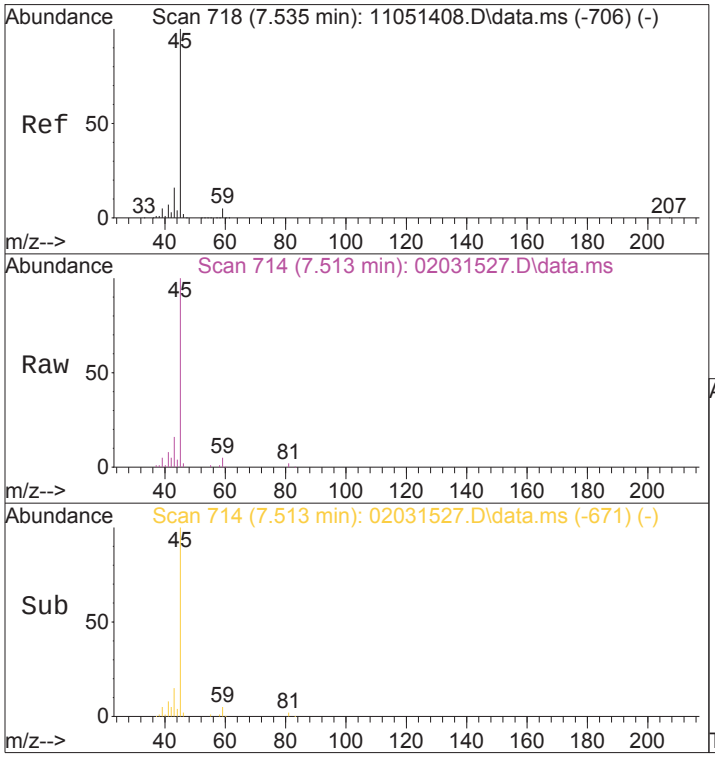


#14
Trichlorofluoromethane
Concen: 0.99 ng
RT: 7.28 min Scan# 671
Delta R.T. -0.017 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion:101 Resp: 27022

Ion	Ratio	Lower	Upper
101	100		
103	64.1	45.4	85.4

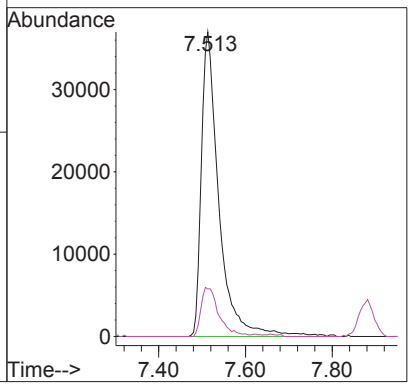


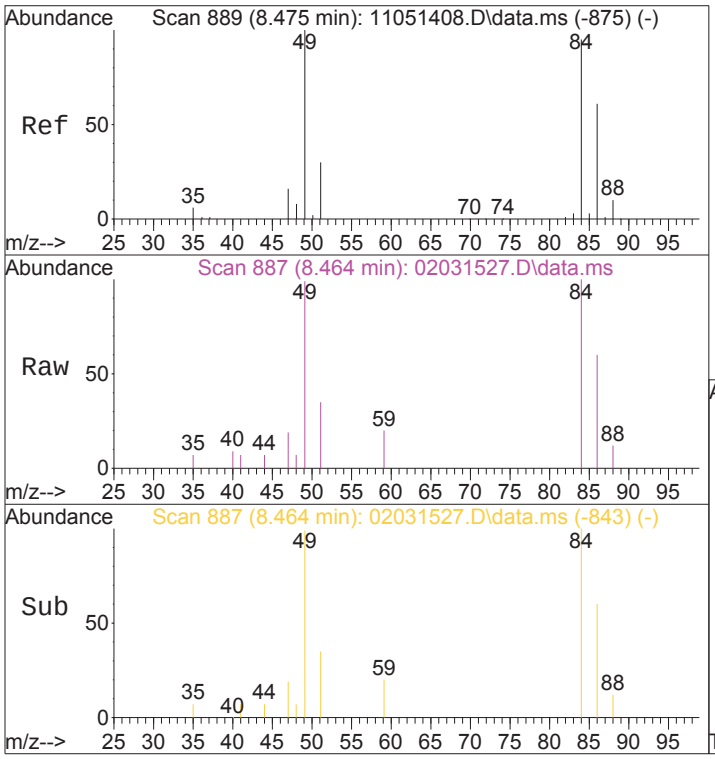


#15
2-Propanol (Isopropanol)
Concen: 2.58 ng
RT: 7.51 min Scan# 714
Delta R.T. -0.011 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 45 Resp: 103456

Ion	Ratio	Lower	Upper
45	100		
43	16.4	0.0	36.1

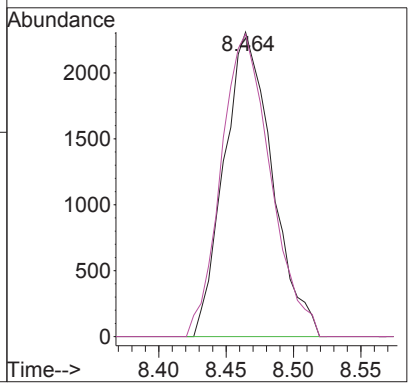


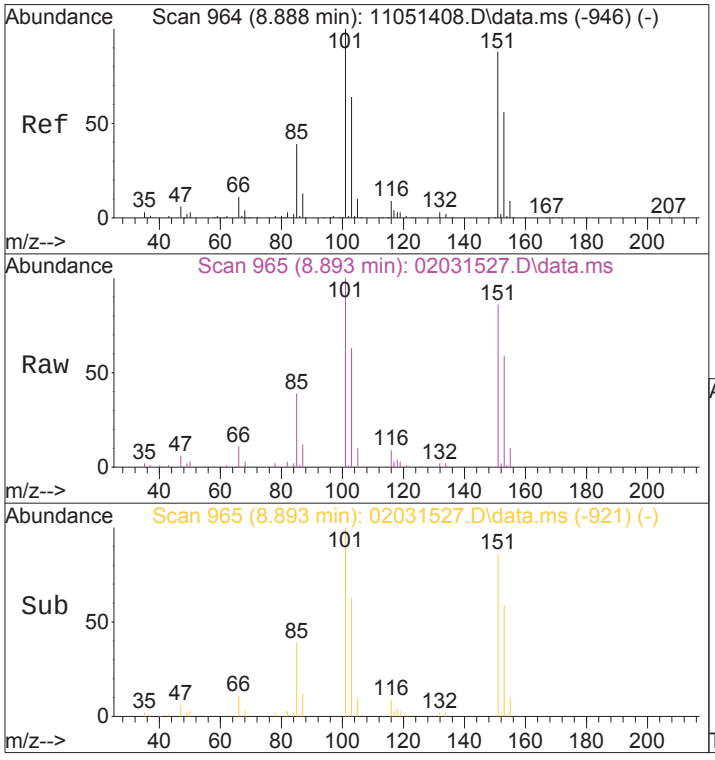


#19
Methylene Chloride
Concen: 0.29 ng
RT: 8.46 min Scan# 887
Delta R.T. -0.006 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 84 Resp: 5727

Ion	Ratio	Lower	Upper
84	100		
49	102.1	75.5	125.5

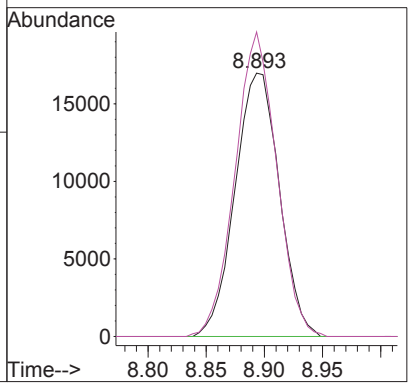


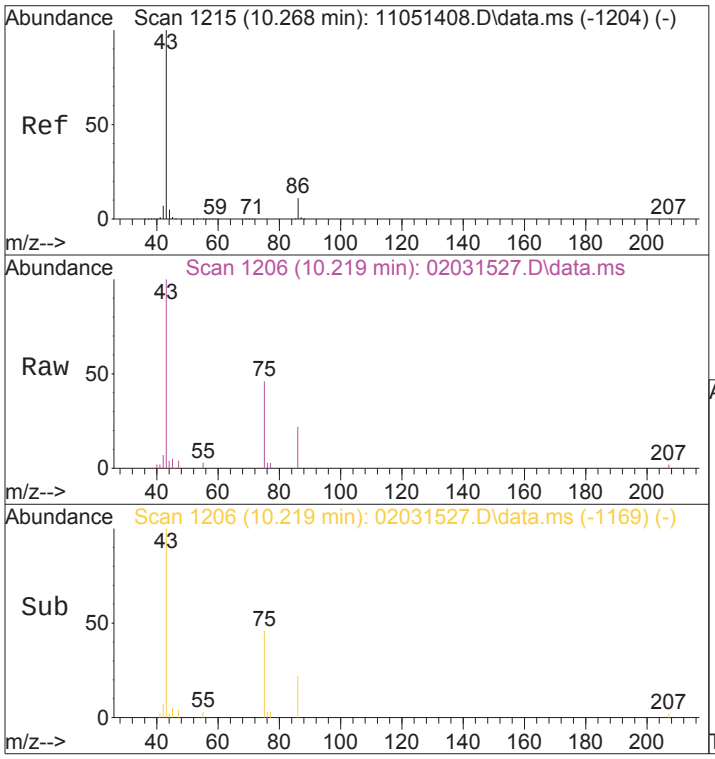


#21
Trichlorotrifluoroethane
Concen: 2.60 ng
RT: 8.89 min Scan# 965
Delta R.T. -0.006 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion:151 Resp: 45147

Ion	Ratio	Lower	Upper
151	100		
101	108.2	89.5	129.5

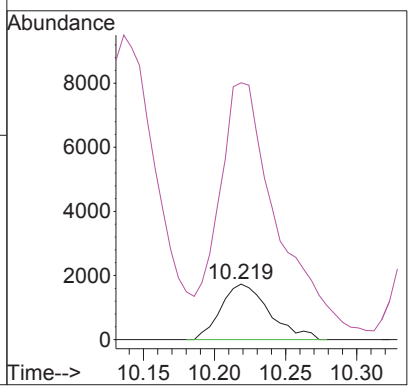


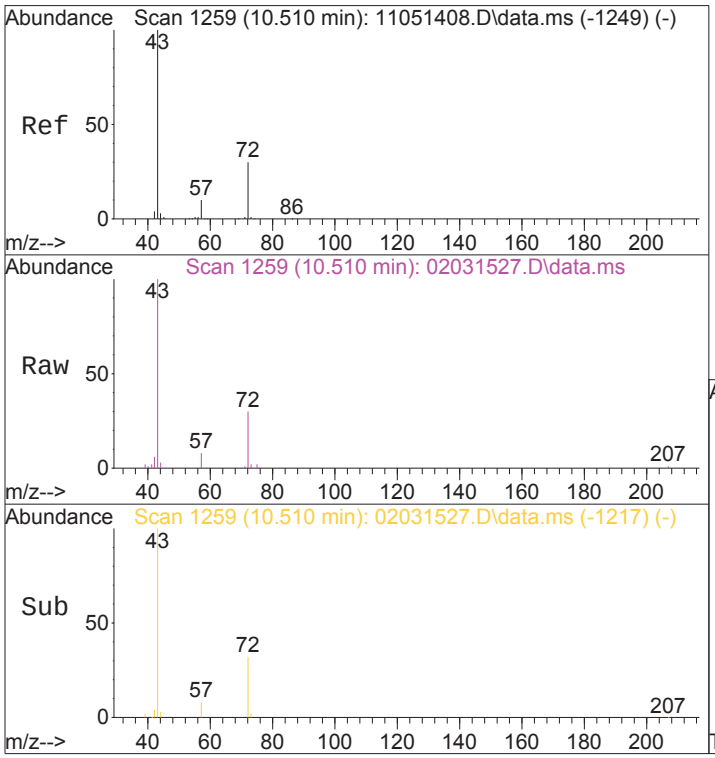


#26
Vinyl Acetate
Concen: 0.95 ng
RT: 10.22 min Scan# 1206
Delta R.T. -0.044 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 86 Resp: 4100

Ion	Ratio	Lower	Upper
86	100		
43	573.2	834.2	874.2#

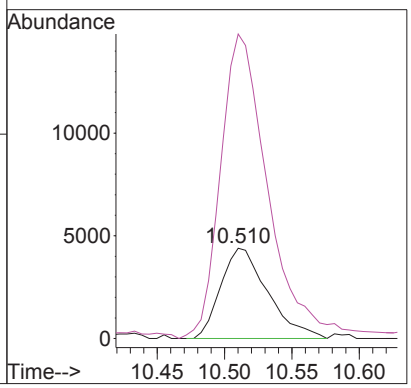


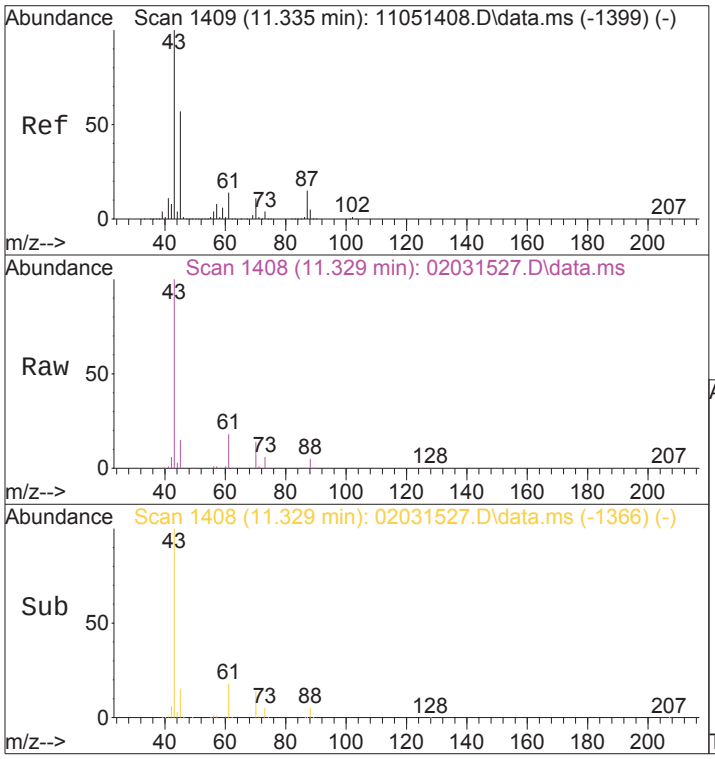


#27
2-Butanone (MEK)
Concen: 0.88 ng
RT: 10.51 min Scan# 1259
Delta R.T. -0.017 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 72 Resp: 10671

Ion	Ratio	Lower	Upper
72	100		
43	350.6	312.1	352.1

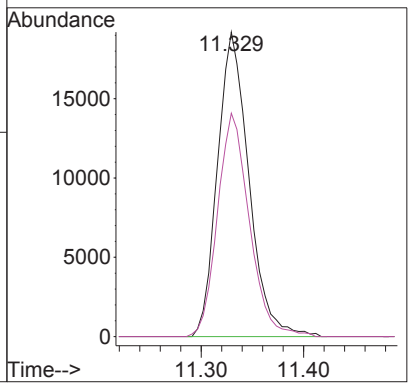


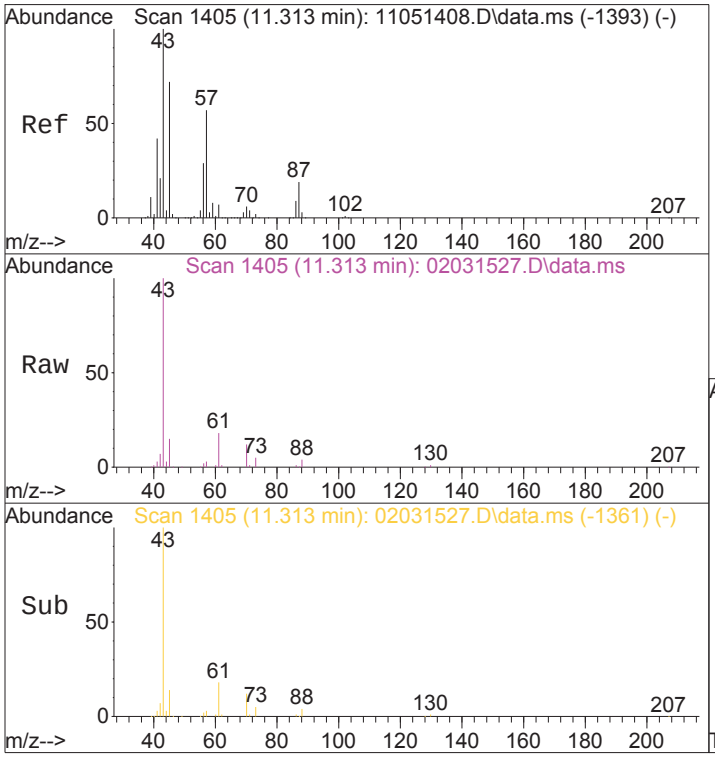


#30
Ethyl Acetate
Concen: 6.63 ng
RT: 11.33 min Scan# 1408
Delta R.T. -0.017 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 61 Resp: 40971

Ion	Ratio	Lower	Upper
61	100		
70	74.3	59.6	99.6

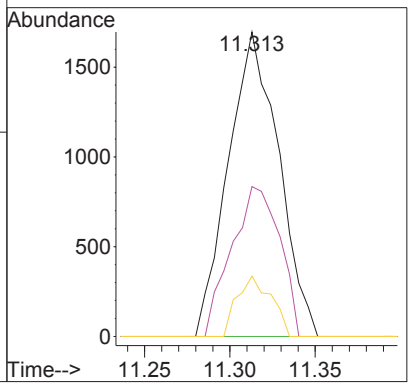


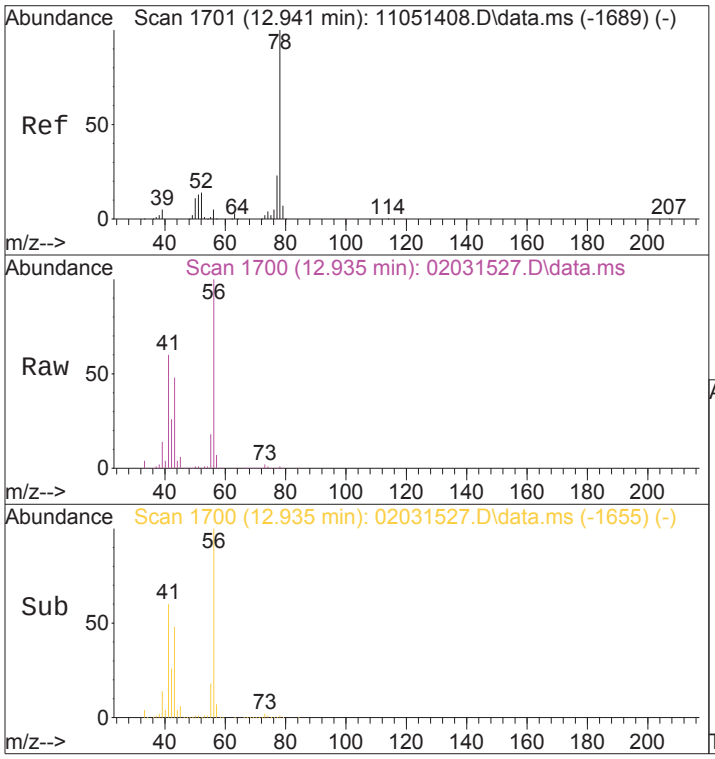


#31
n-Hexane
Concen: 0.14 ng
RT: 11.31 min Scan# 1405
Delta R.T. -0.006 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 57 Resp: 3469

Ion	Ratio	Lower	Upper
57	100		
56	47.4	40.7	61.1
86	0.0	14.0	21.0#

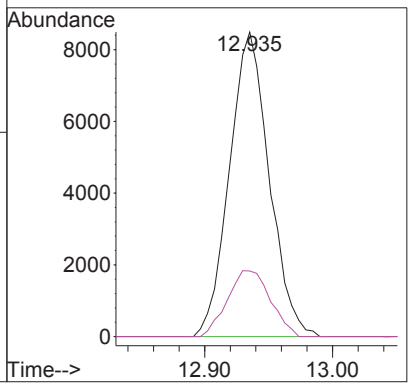


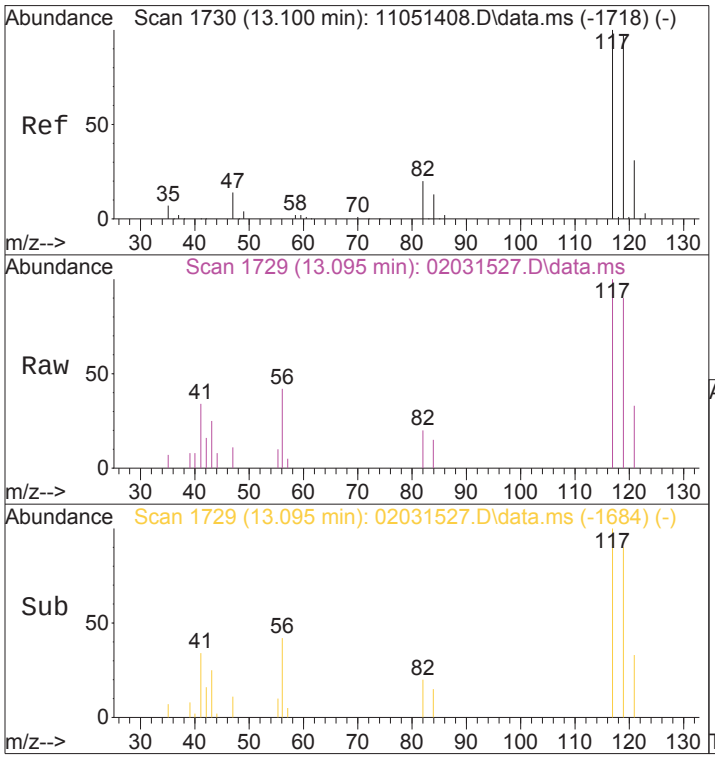


#41
Benzene
Concen: 0.24 ng
RT: 12.94 min Scan# 1700
Delta R.T. -0.000 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 78 Resp: 18314

Ion	Ratio	Lower	Upper
78	100		
77	23.4	2.9	42.9

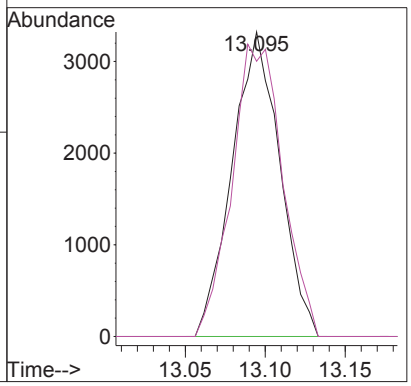


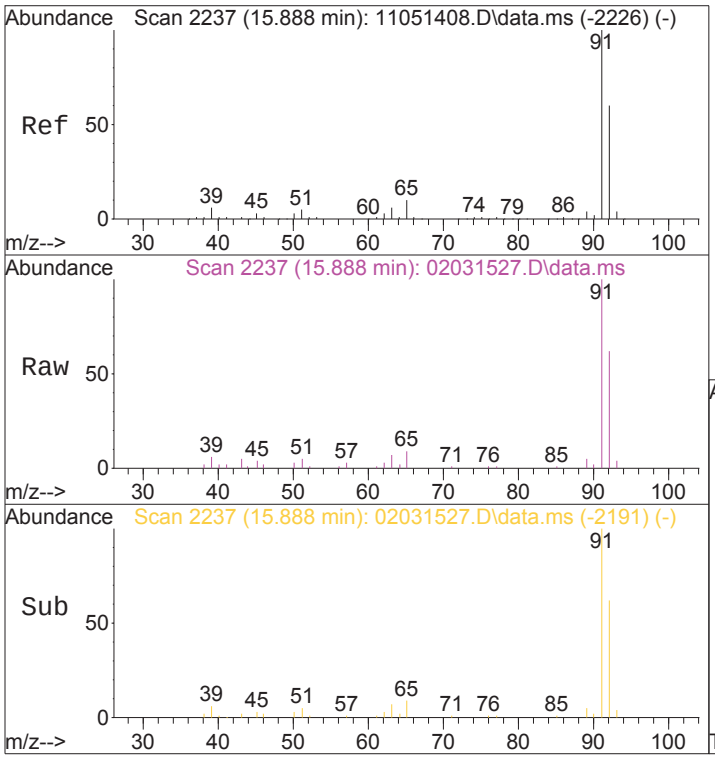


#42
Carbon Tetrachloride
Concen: 0.31 ng
RT: 13.09 min Scan# 1729
Delta R.T. -0.000 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion:117 Resp: 6892

Ion	Ratio	Lower	Upper
117	100		
119	102.3	77.6	117.6

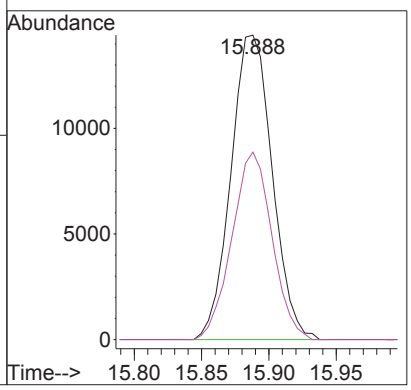


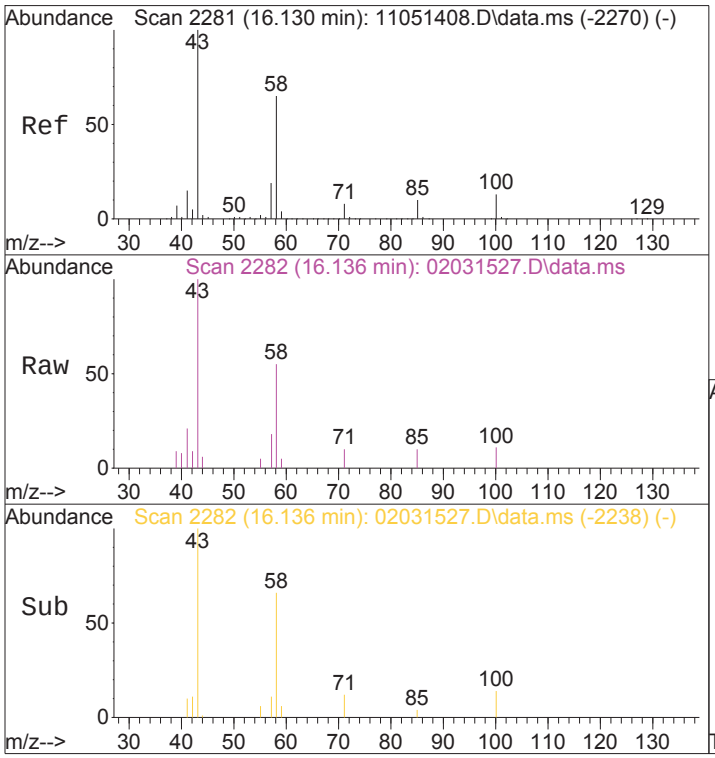


#58
Toluene
Concen: 0.36 ng
RT: 15.89 min Scan# 2237
Delta R.T. 0.005 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 91 Resp: 30756

Ion	Ratio	Lower	Upper
91	100		
92	59.7	40.1	80.1

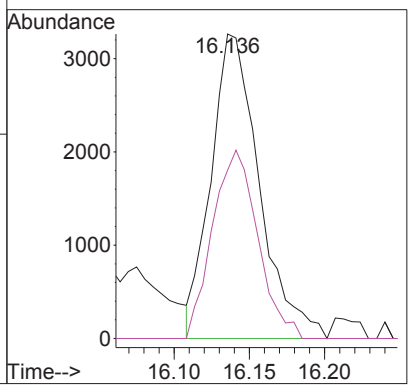


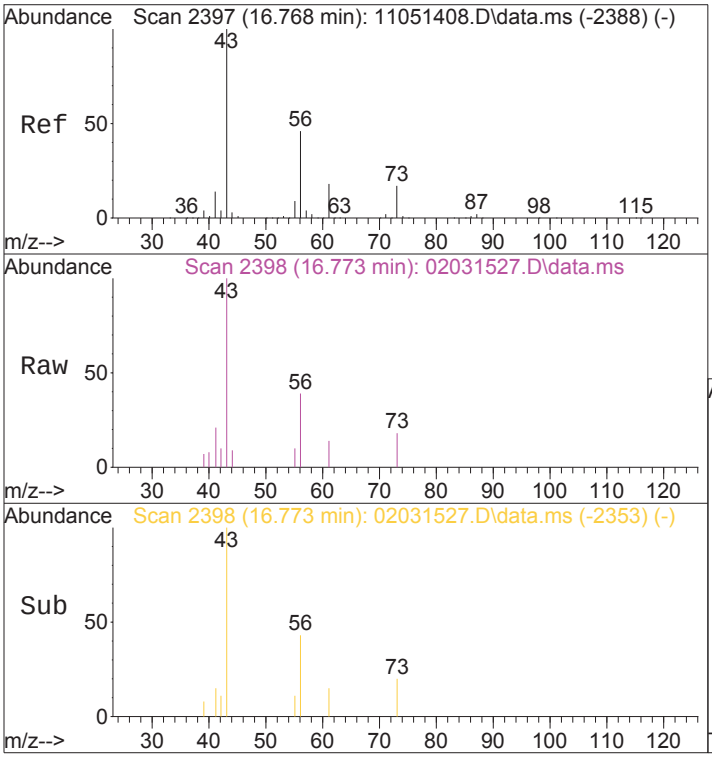


#59
2-Hexanone
Concen: 0.21 ng
RT: 16.14 min Scan# 2282
Delta R.T. -0.005 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 43 Resp: 7293

Ion	Ratio	Lower	Upper
43	100		
58	57.7	46.0	86.0

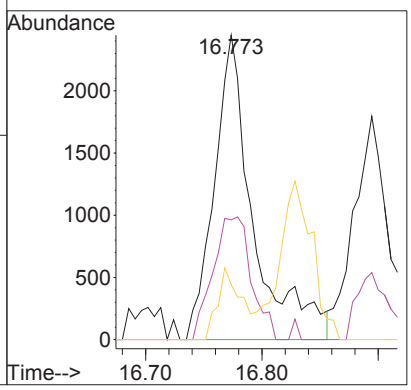


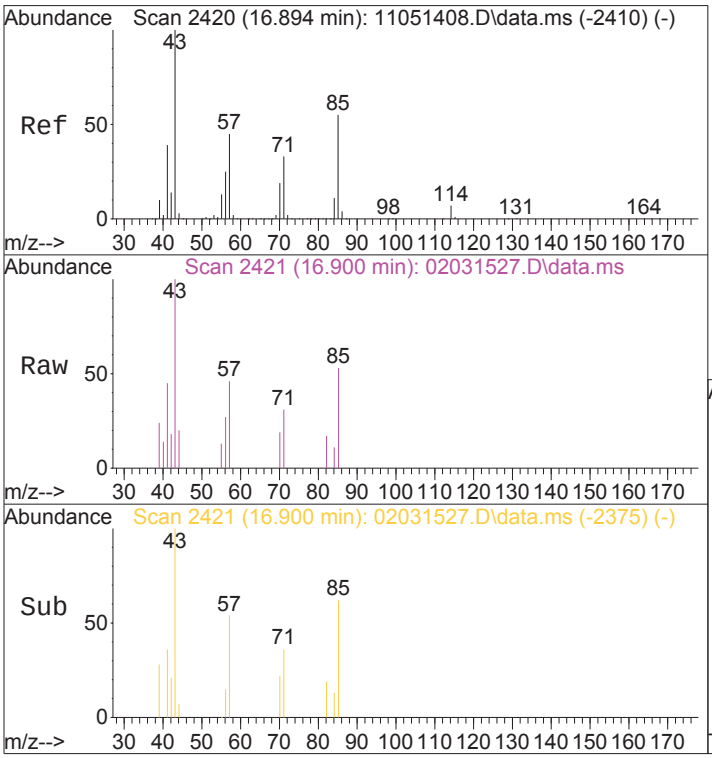


#62
n-Butyl Acetate
Concen: 0.14 ng
RT: 16.77 min Scan# 2398
Delta R.T. -0.001 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 43 Resp: 5696

Ion	Ratio	Lower	Upper
43	100		
56	39.7	26.2	66.2
73	15.2	0.0	38.2

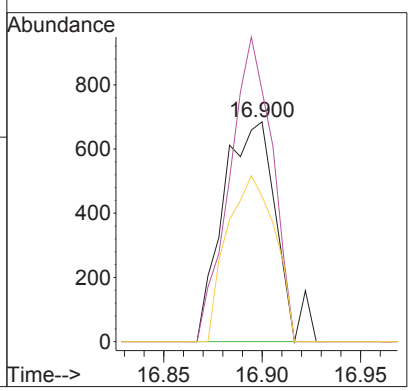


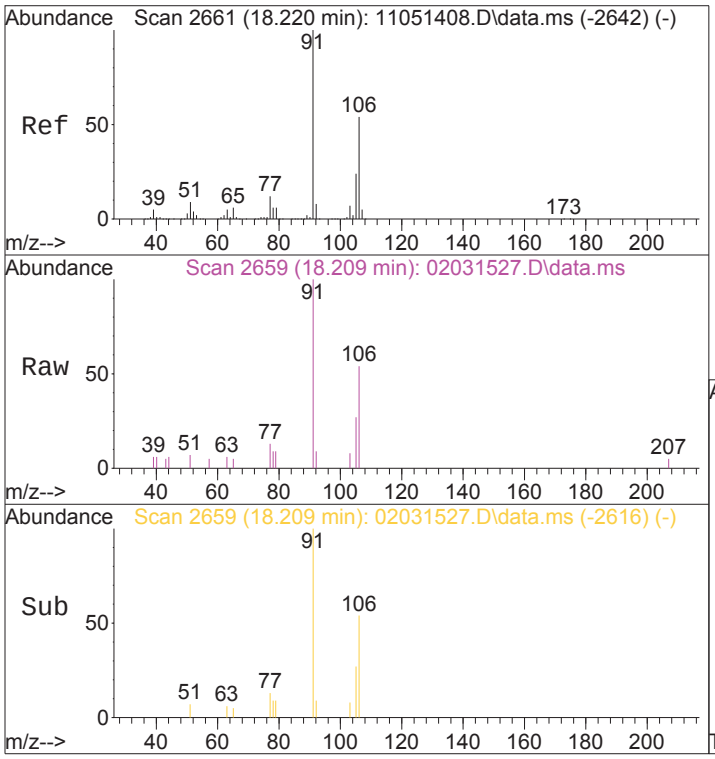


#63
n-Octane
Concen: 0.09 ng
RT: 16.90 min Scan# 2421
Delta R.T. 0.005 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 57 Resp: 1287

Ion	Ratio	Lower	Upper
57	100		
85	111.0	102.5	153.7
71	68.1	60.9	91.3

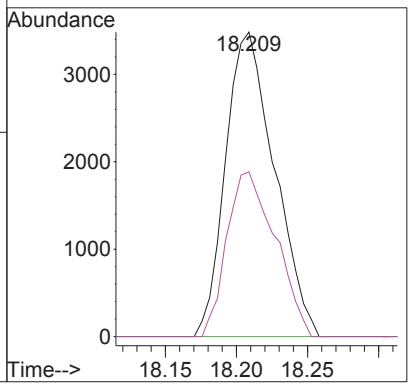


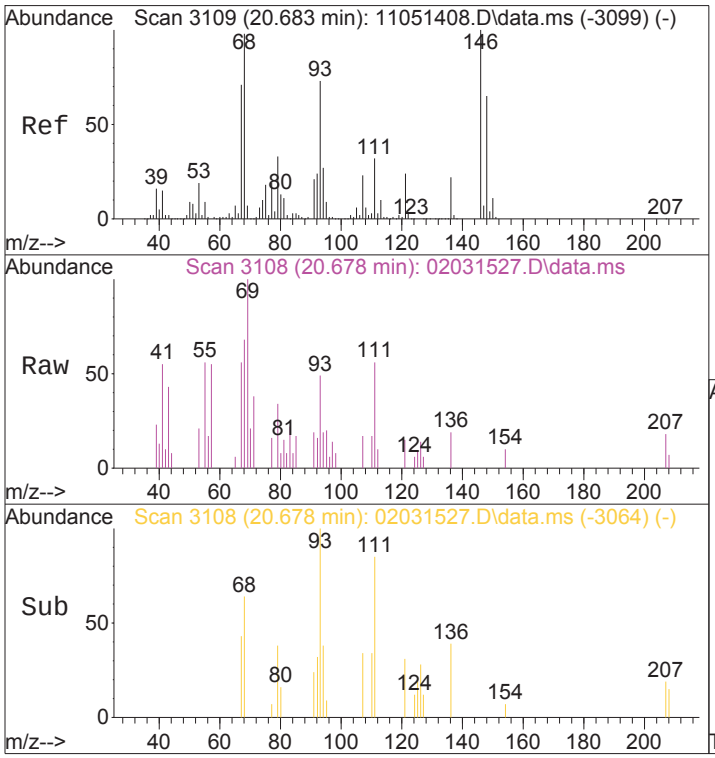


#67
m- p- ylenes
Concen: 0.12 ng
RT: 18.21 min Scan# 2659
Delta R.T. -0.011 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 91 Resp: 8336

Ion	Ratio	Lower	Upper
91	100		
106	53.7	33.3	73.3

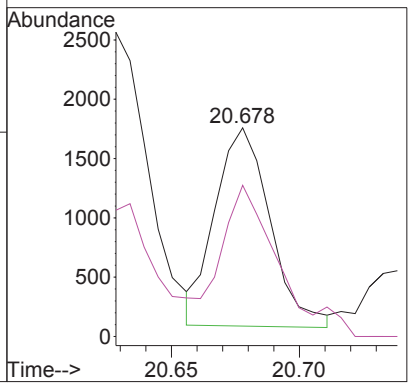




#91
d-Limonene
Concen: 0.10 ng
RT: 20.68 min Scan# 3108
Delta R.T. -0.006 min
Lab File: 02031527.D
Acq: 3 Feb 2015 19:10

Tgt Ion: 68 Resp: 2503

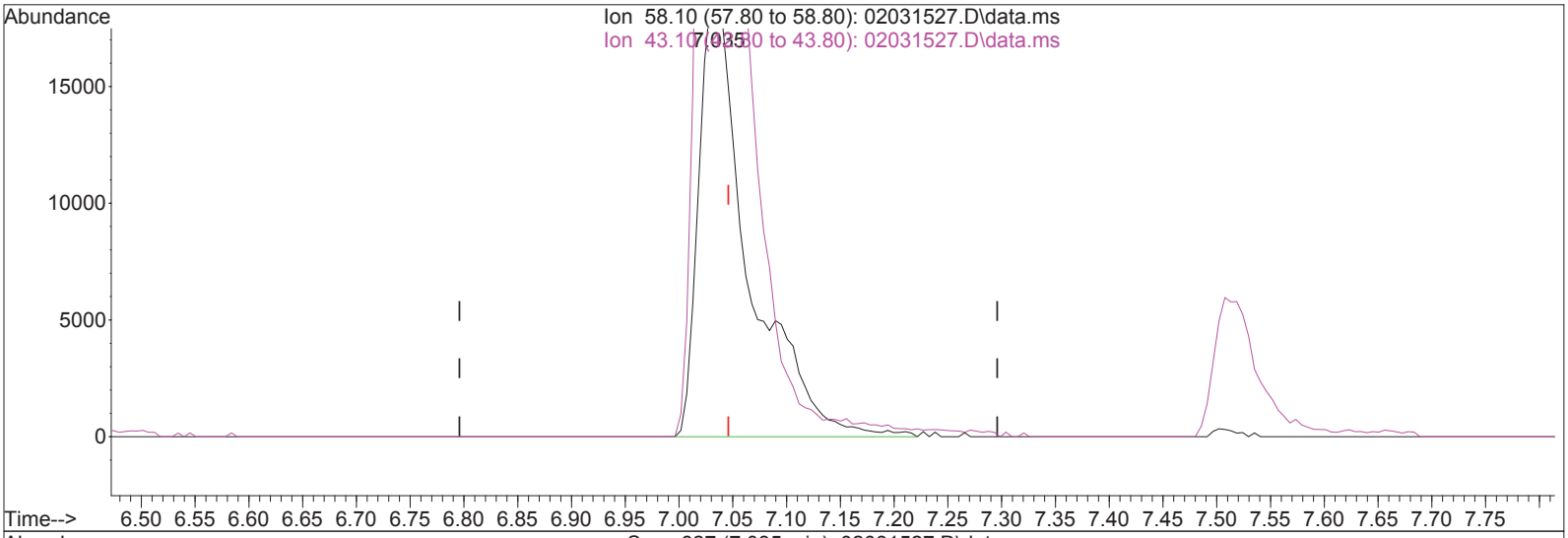
Ion	Ratio	Lower	Upper
68	100		
93	77.5	57.0	97.0

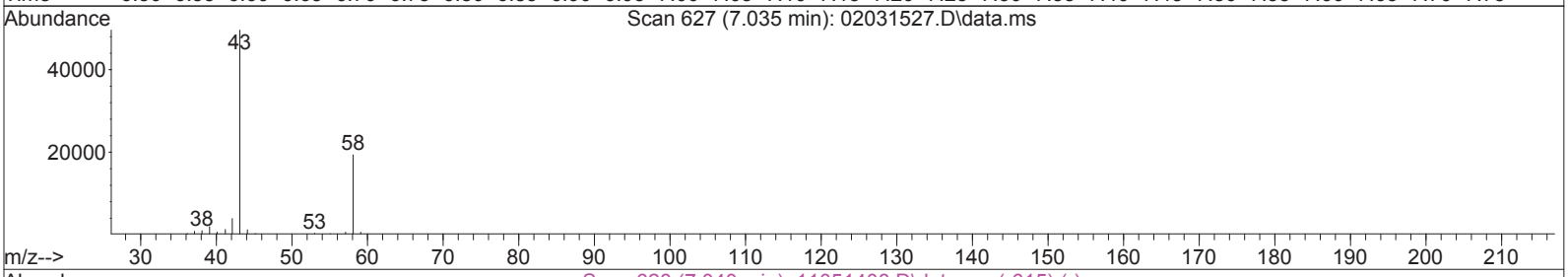


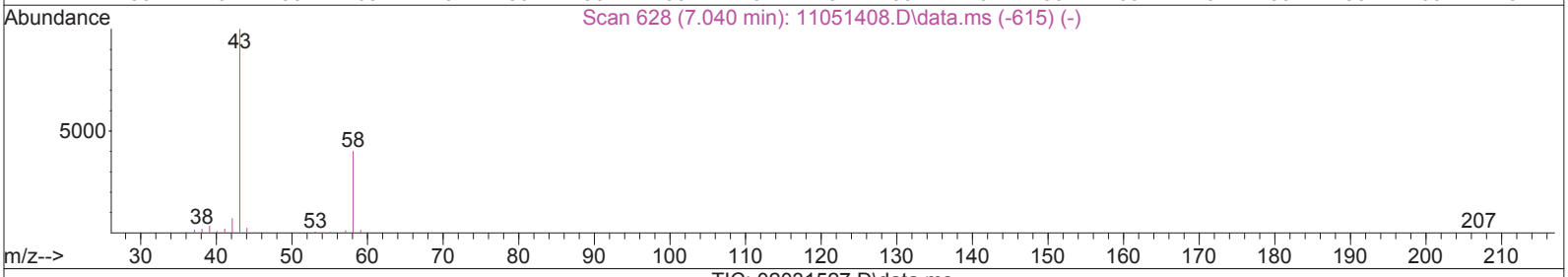
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2015_02\03\02031527.D
Acq On : 3 Feb 2015 19:10 Operator: LH
Sample : P1500308-002 dup (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 04 07:07:34 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 02031527.D\data.ms

(13) Acetone (T)

7.035min (-0.011) 4.82ng

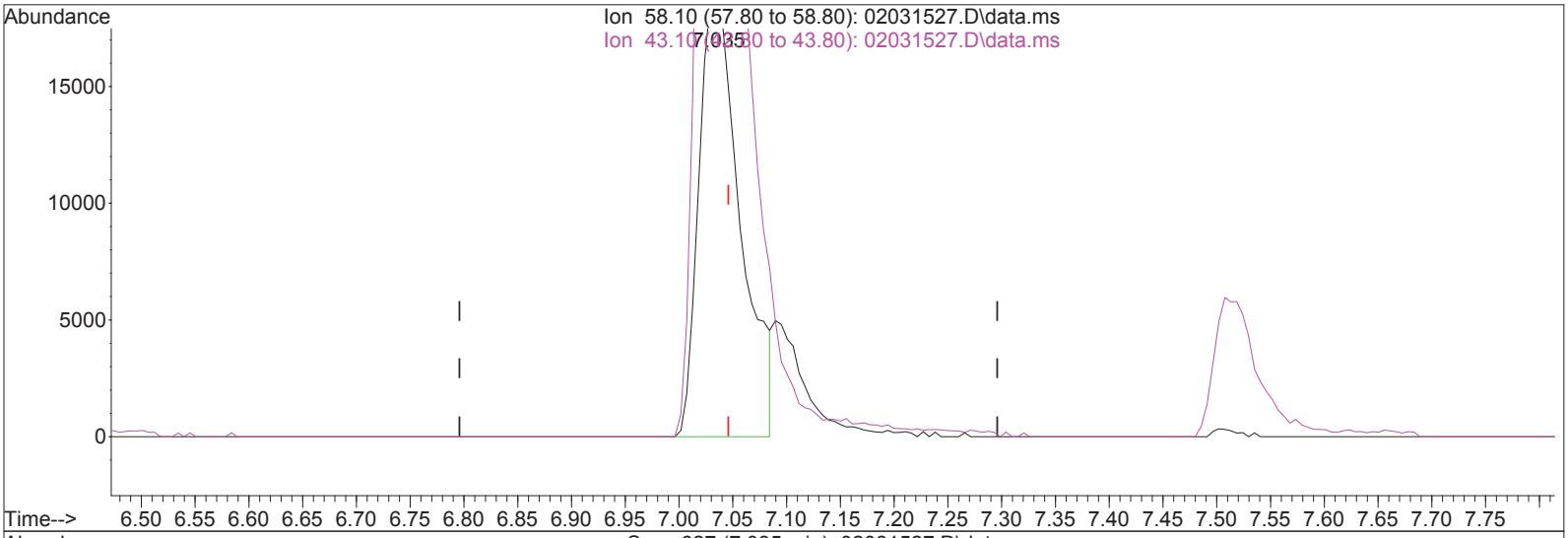
response 61058

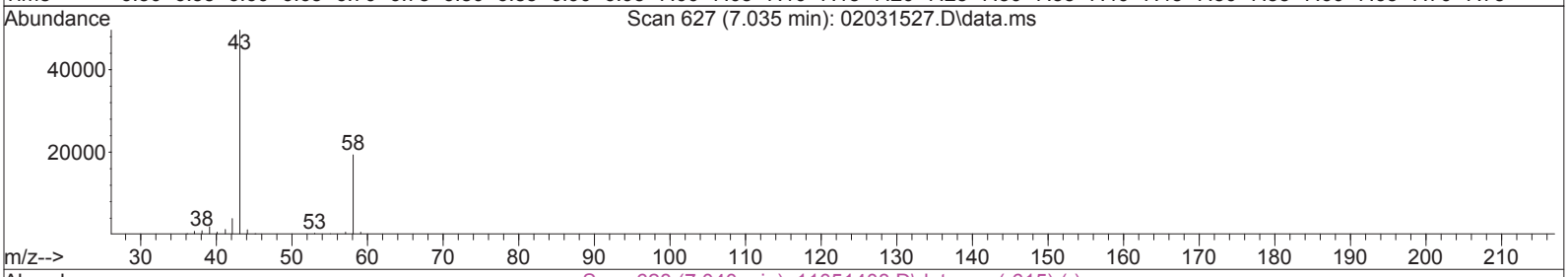
Ion	Exp%	Act%
58.10	100	100
43.10	250.10	229.17
0.00	0.00	0.00
0.00	0.00	0.00

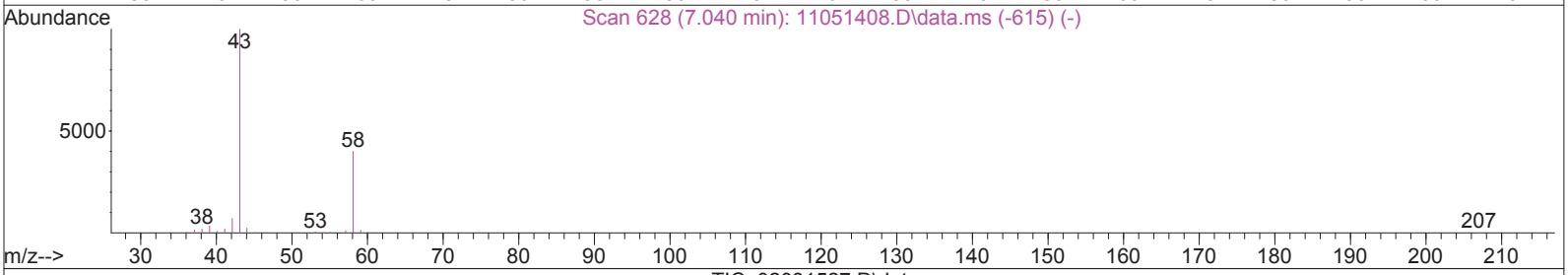
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2015_02\03\02031527.D
Acq On : 3 Feb 2015 19:10 Operator: LH
Sample : P1500308-002 dup (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 04 07:07:34 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 02031527.D\data.ms

(13) Acetone (T)

7.035min (-0.011) 4.00ng m

response 50701

Ion	Exp%	Act%
58.10	100	100
43.10	250.10	275.98
0.00	0.00	0.00
0.00	0.00	0.00

IPC

LH 2/6/15

2/6/15

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031527.D
Acq On : 3 Feb 2015 19:10 Operator: LH
Sample : P1500308-002 dup (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:26:29 2015
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : ed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 2/6/15

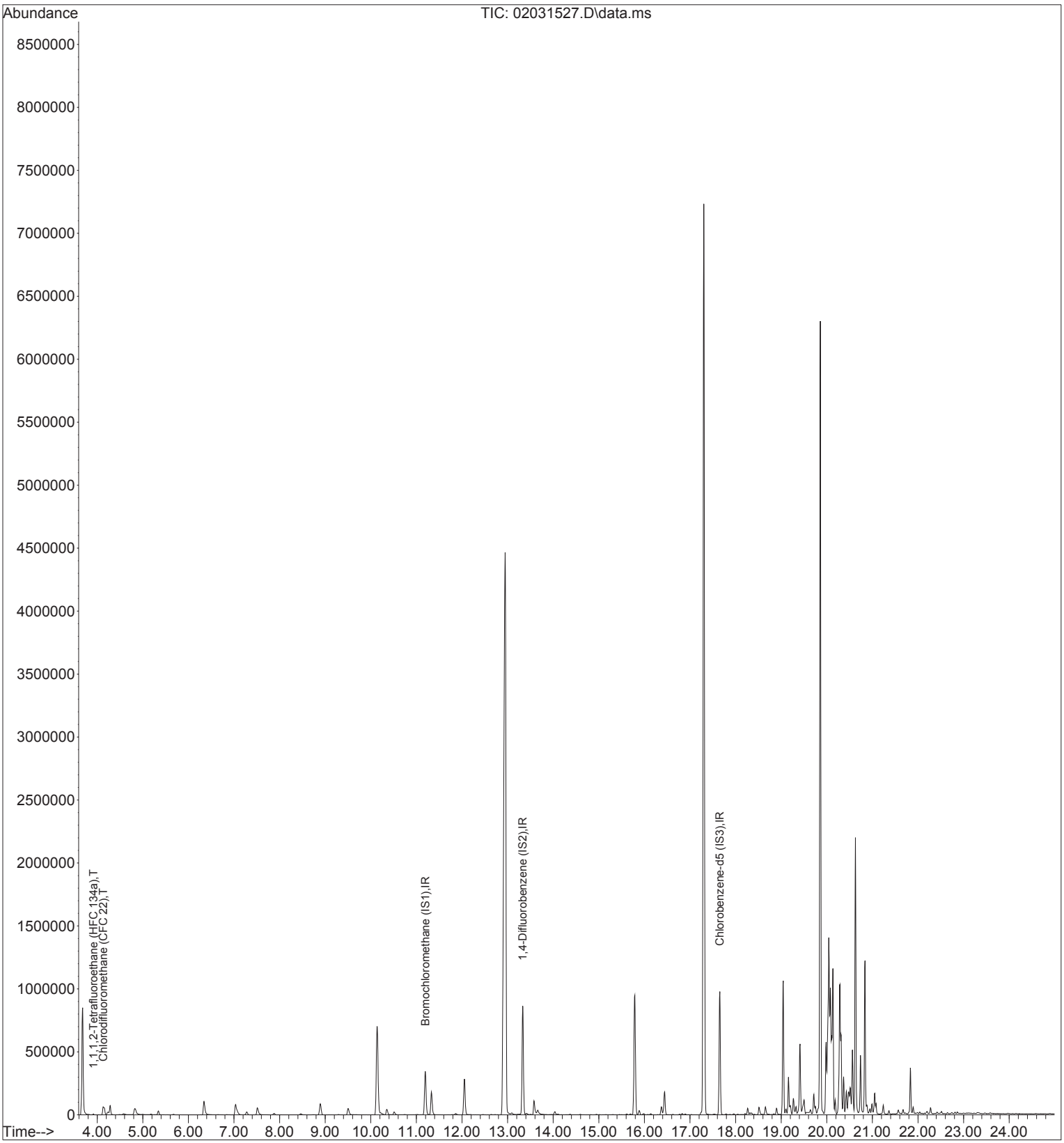
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	189063	12.500	ng	-0.01
16) 1,4-Difluorobenzene (IS2)	13.33	114	923895	12.500	ng	-0.01
19) Chlorobenzene-d5 (IS3)	17.65	82	334784	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.82	85	915	N.D.		
3) 1,1,1,2-Tetrafluoroeth...	3.92	83	3031	0.200	ng	83
4) 1,1-Difluoroethane	4.03	65	483	N.D.		
5) Chlorodifluoromethane ...	4.13	67	1869	0.441	ng	89
6) 1-Chloro-1,1-Difluoroe...	4.58	65	1902	N.D.		
7) Dichlorofluoromethane ...	6.27	67	227	N.D.		
8) Vinylbromide	0.00	108	0	N.D.		
9) 2,2-Dichloro-1,1,1-tri...	0.00	83	0	N.D.		
10) 2-Methylbutane	0.00	57	0	N.D. d		
11) Methyl Acetate	8.50	43	1763	N.D.		
12) 2-Methylpentane	10.26	71	1451	N.D.		
13) 2,2-Dichloropropane	0.00	77	0	N.D.		
14) 1,1-Dichloropropene	12.79	75	55	N.D.		
15) Thiophene	13.09	84	1350	N.D.		
17) 2,3-Dimethylpentane	13.51	56	1106	N.D.		
18) Dibromomethane	13.74	174	61	N.D.		
20) Methyl Cyclohexane	15.02	55	796	N.D.		
21) 1,3-Dichloropropane	15.90	76	120	N.D.		
22) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.		
23) 1-Chlorohexane	17.87	91	290	N.D.		
24) 1,2,3-Trichloropropane	18.74	75	401	N.D.		
25) Bromobenzene	19.25	77	412	N.D.		
26) 2-Chlorotoluene	19.62	91	3151	N.D.		
27) 4-Chlorotoluene	19.62	91	3151	N.D.		
28) Indan	20.73	117	1142	N.D.		
29) Indene	20.80	115	531	N.D.		
30) 1,2,4,5-Tetramethylben...	21.61	119	1097	N.D.		
31) 1,2,3,4-Tetramethylben...	21.61	119	1097	N.D.		
32) 1,2,3,5-Tetramethylben...	21.94	119	1089	N.D.		
33) 1,2,3-Trichlorobenzene	22.52	180	324	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031527.D
Acq On : 3 Feb 2015 19:10 Operator: LH
Sample : P1500308-002 dup (1000mL)
Misc : S29-01071501
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 06 12:26:29 2015
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : ed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031504.D
Acq On : 3 Feb 2015 2:47 Operator: LH
Sample : MB R16020315_1000mL
Misc : S29-01071501
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 03 08:43:24 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 2/3/15

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	175451	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.33	114	859547	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	301123	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.05	65	199799	13.167	ng		0.00
Spiked Amount 12.500			Recovery = 105.36%				
57) Toluene-d8 (SS2)	15.78	98	728731	12.329	ng		0.00
Spiked Amount 12.500			Recovery = 98.64%				
73) Bromofluorobenzene (SS3)	19.04	174	350927	12.167	ng		0.00
Spiked Amount 12.500			Recovery = 97.36%				
Target Compounds							Qvalue
2) Propene	0.00	42	0	N.D. d			
3) Dichlorodifluoromethan...	0.00	85	0	N.D.			
4) Chloromethane	0.00	50	0	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.38	45	3702	0.340	ng		96
11) Acetonitrile	6.69	41	3283	0.121	ng	#	1
12) Acrolein	6.86	56	722	0.075	ng	#	16
13) Acetone	7.07	58	6909m	0.587	ng		
14) Trichlorofluoromethane	0.00	101	0	N.D.			
15) 2-Propanol (Isopropanol)	7.59	45	1614	N.D.			
16) Acrylonitrile	7.88	53	58	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.			
19) Methylene Chloride	8.47	84	1749	0.096	ng		88
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.			
21) Trichlorotrifluoroethane	0.00	151	0	N.D.			
22) Carbon Disulfide	8.76	76	520	N.D.			
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D.			
27) 2-Butanone (MEK)	10.56	72	520	N.D.			
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	0.00	61	0	N.D.			
31) n-Hexane	0.00	57	0	N.D.			
32) Chloroform	0.00	83	0	N.D.			
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	12.98	56	577	N.D.			
41) Benzene	0.00	78	0	N.D.			
42) Carbon Tetrachloride	0.00	117	0	N.D.			
43) Cyclohexane	13.32	84	511	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.			
47) Trichloroethene	0.00	130	0	N.D.			
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.			

Data File: I:\MS16\DATA\2015_02\03\02031504.D
Acq On : 3 Feb 2015 2:47 Operator: LH
Sample : MB R16020315_1000mL
Misc : S29-01071501
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 03 08:43:24 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

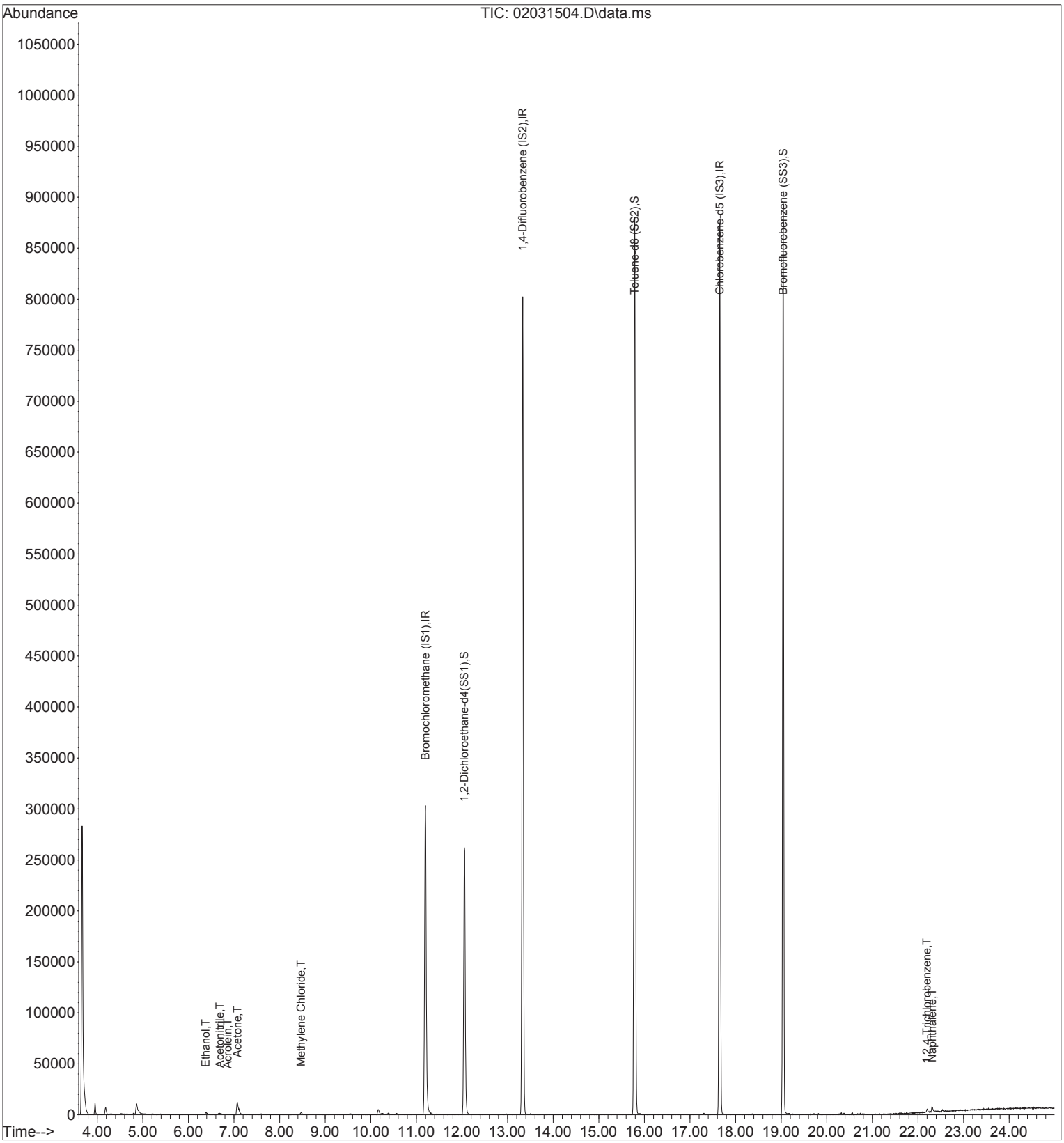
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.			
51) n-Heptane	0.00	71	0	N.D.			
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.			
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.			
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.			
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.			
58) Toluene	15.88	91	882	N.D.			
59) 2-Hexanone	0.00	43	0	N.D.			
60) Dibromochloromethane	0.00	129	0	N.D.			
61) 1,2-Dibromoethane	0.00	107	0	N.D.			
62) n-Butyl Acetate	0.00	43	0	N.D.			
63) n-Octane	0.00	57	0	N.D.			
64) Tetrachloroethene	0.00	166	0	N.D.			
65) Chlorobenzene	0.00	112	0	N.D.			
66) Ethylbenzene	0.00	91	0	N.D.			
67) m- p- ylenes	0.00	91	0	N.D.			
68) Bromoform	0.00	173	0	N.D.			
69) Styrene	0.00	104	0	N.D.			
70) o- ylene	0.00	91	0	N.D.			
71) n-Nonane	0.00	43	0	N.D.			
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.			
74) Cumene	19.17	105	872	N.D.			
75) alpha-Pinene	0.00	93	0	N.D.			
76) n-Propylbenzene	19.59	91	771	N.D.			
77) 3-Ethyltoluene	19.72	105	1756	N.D.			
78) 4-Ethyltoluene	19.72	105	1756	N.D.			
79) 1,3,5-Trimethylbenzene	19.82	105	945	N.D.			
80) alpha-Methylstyrene	0.00	118	0	N.D.			
81) 2-Ethyltoluene	19.82	105	945	N.D.			
82) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.			
83) n-Decane	0.00	57	0	N.D.			
84) Benzyl Chloride	20.31	91	638	N.D.			
85) 1,3-Dichlorobenzene	20.32	146	908	N.D.			
86) 1,4-Dichlorobenzene	20.38	146	1345	N.D.			
87) sec-Butylbenzene	20.56	105	1028	N.D.			
88) 4-Isopropyltoluene (p-...	20.56	119	912	N.D.			
89) 1,2,3-Trimethylbenzene	20.56	105	1028	N.D.			
90) 1,2-Dichlorobenzene	20.68	146	648	N.D.			
91) d-Limonene	0.00	68	0	N.D.			
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.			
93) n-Undecane	0.00	57	0	N.D.			
94) 1,2,4-Trichlorobenzene	22.20	180	2199	0.060	ng	#	81
95) Naphthalene	22.31	128	10467	0.100	ng		89
96) n-Dodecane	0.00	57	0	N.D.			
97) Hexachlorobutadiene	0.00	225	0	N.D.			
98) Cyclohexanone	18.37	55	776	N.D.			
99) tert-Butylbenzene	0.00	119	0	N.D.			
100) n-Butylbenzene	0.00	91	0	N.D.			

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031504.D
Acq On : 3 Feb 2015 2:47 Operator: LH
Sample : MB R16020315_1000mL
Misc : S29-01071501
ALS Vial : 2 Sample Multiplier: 1

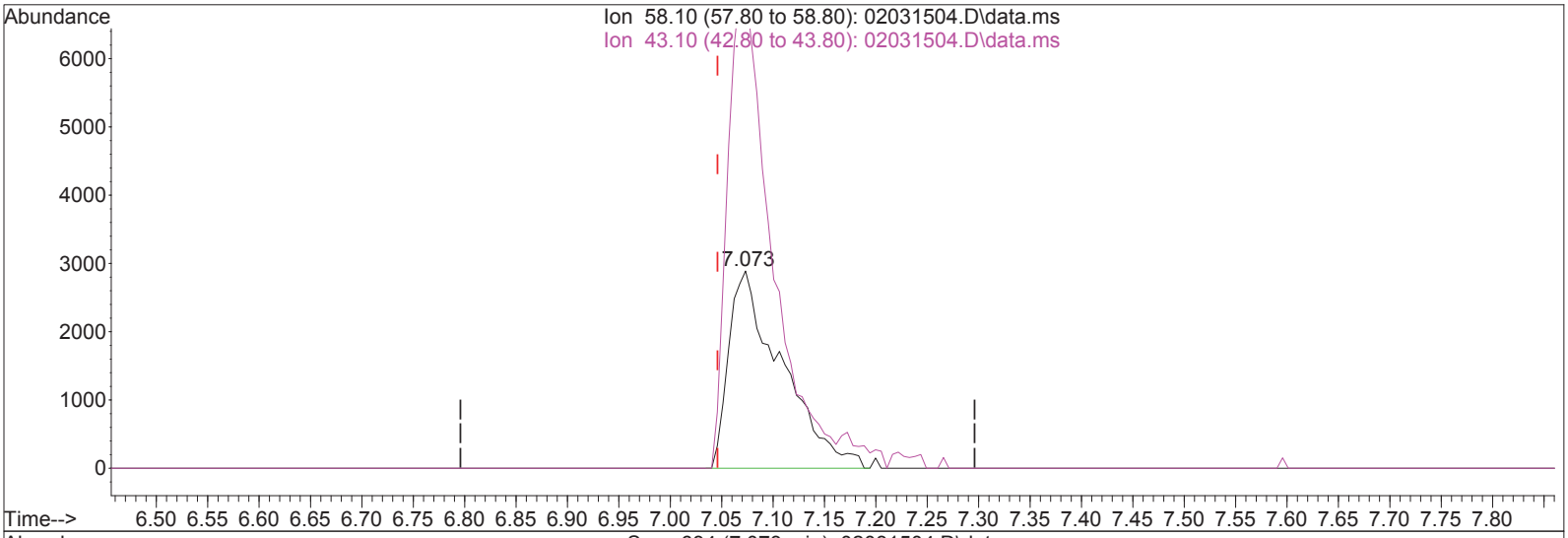
Quant Time: Feb 03 08:43:24 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

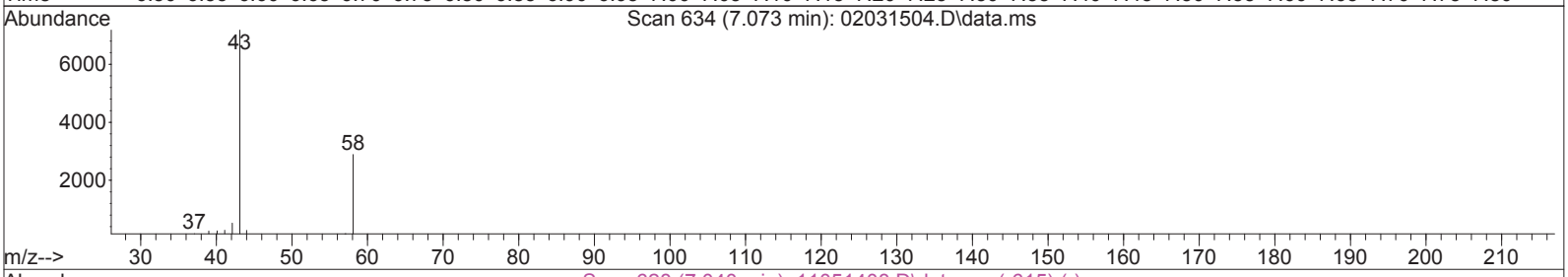


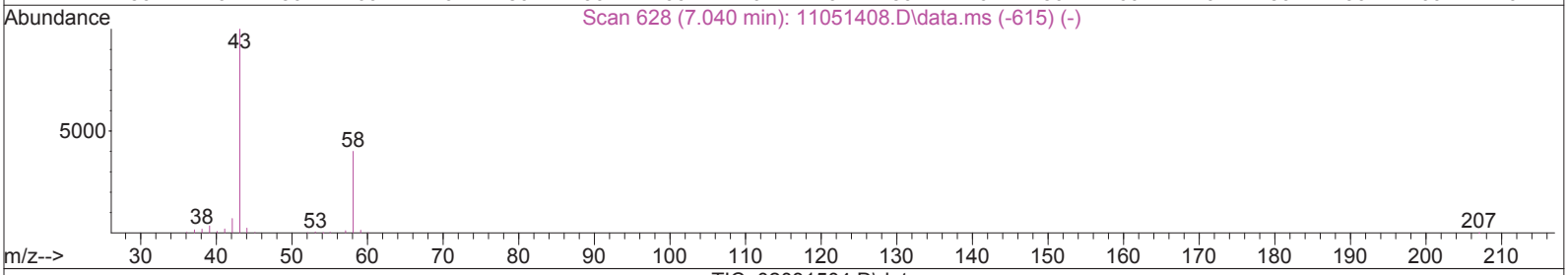
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2015_02\03\02031504.D
Acq On : 3 Feb 2015 2:47 Operator: LH
Sample : MB R16020315_1000mL
Misc : S29-01071501
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 03 08:43:02 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 02031504.D\data.ms

(13) Acetone (T)

7.073min (+0.027) 0.88ng

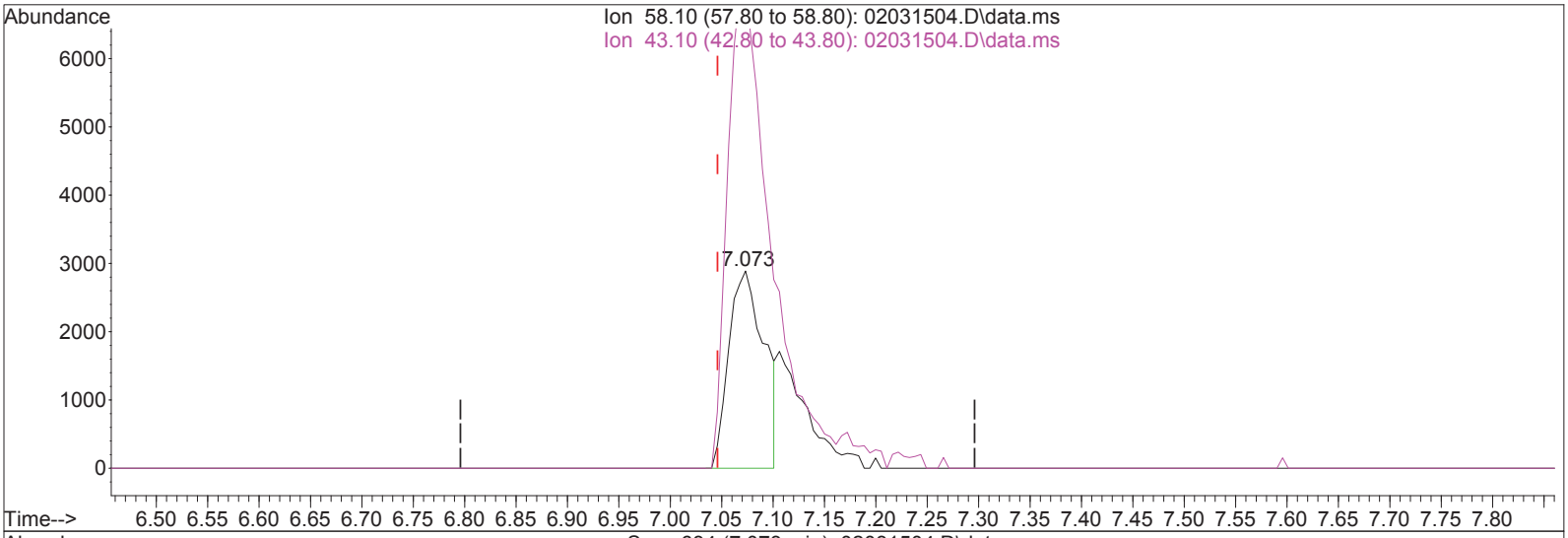
response 10335

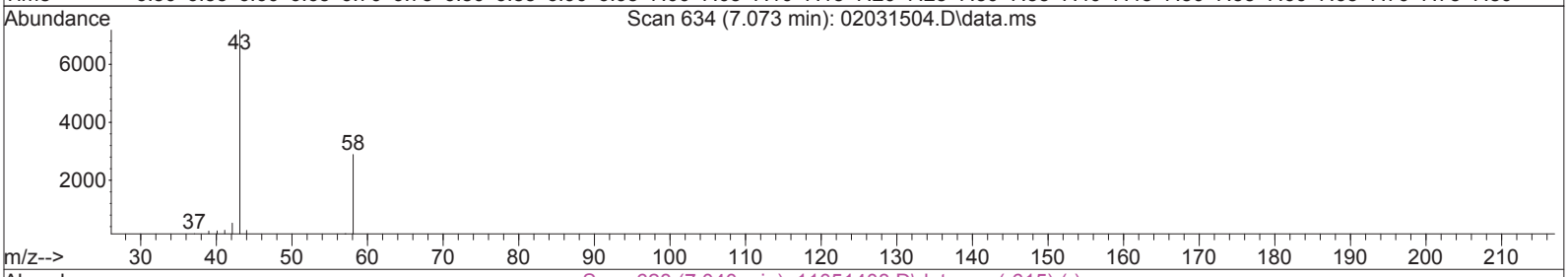
Ion	Exp%	Act%
58.10	100	100
43.10	250.10	209.13#
0.00	0.00	0.00
0.00	0.00	0.00

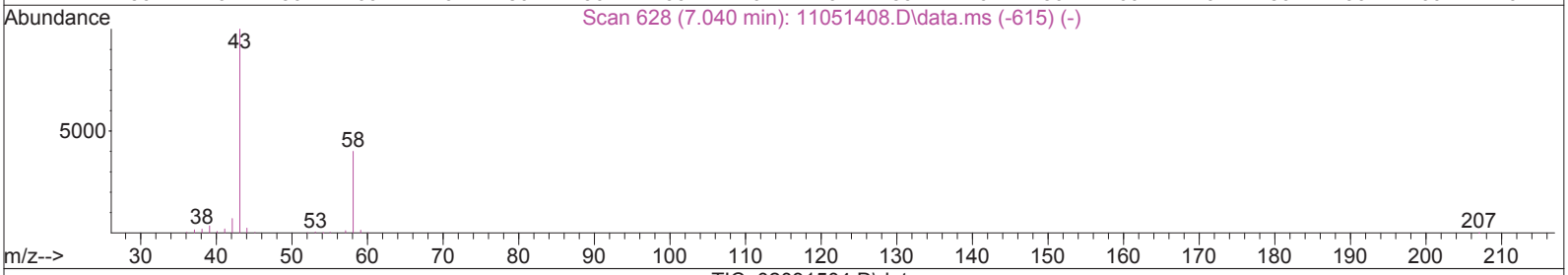
Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2015_02\03\02031504.D
Acq On : 3 Feb 2015 2:47 Operator: LH
Sample : MB R16020315_1000mL
Misc : S29-01071501
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 03 08:43:02 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 02031504.D\data.ms

(13) Acetone (T)

7.073min (+0.027) 0.59ng m

response 6909

Ion	Exp%	Act%
58.10	100	100
43.10	250.10	312.84#
0.00	0.00	0.00
0.00	0.00	0.00

IPC

LH 2/3/15

2/5/15

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031504.D
Acq On : 3 Feb 2015 2:47 Operator: LH
Sample : MB R16020315_1000mL
Misc : S29-01071501
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 03 09:19:05 2015
Quant Method : I:\MS16\METHODS\ACF16110414.M LH 2/3/15
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : ed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

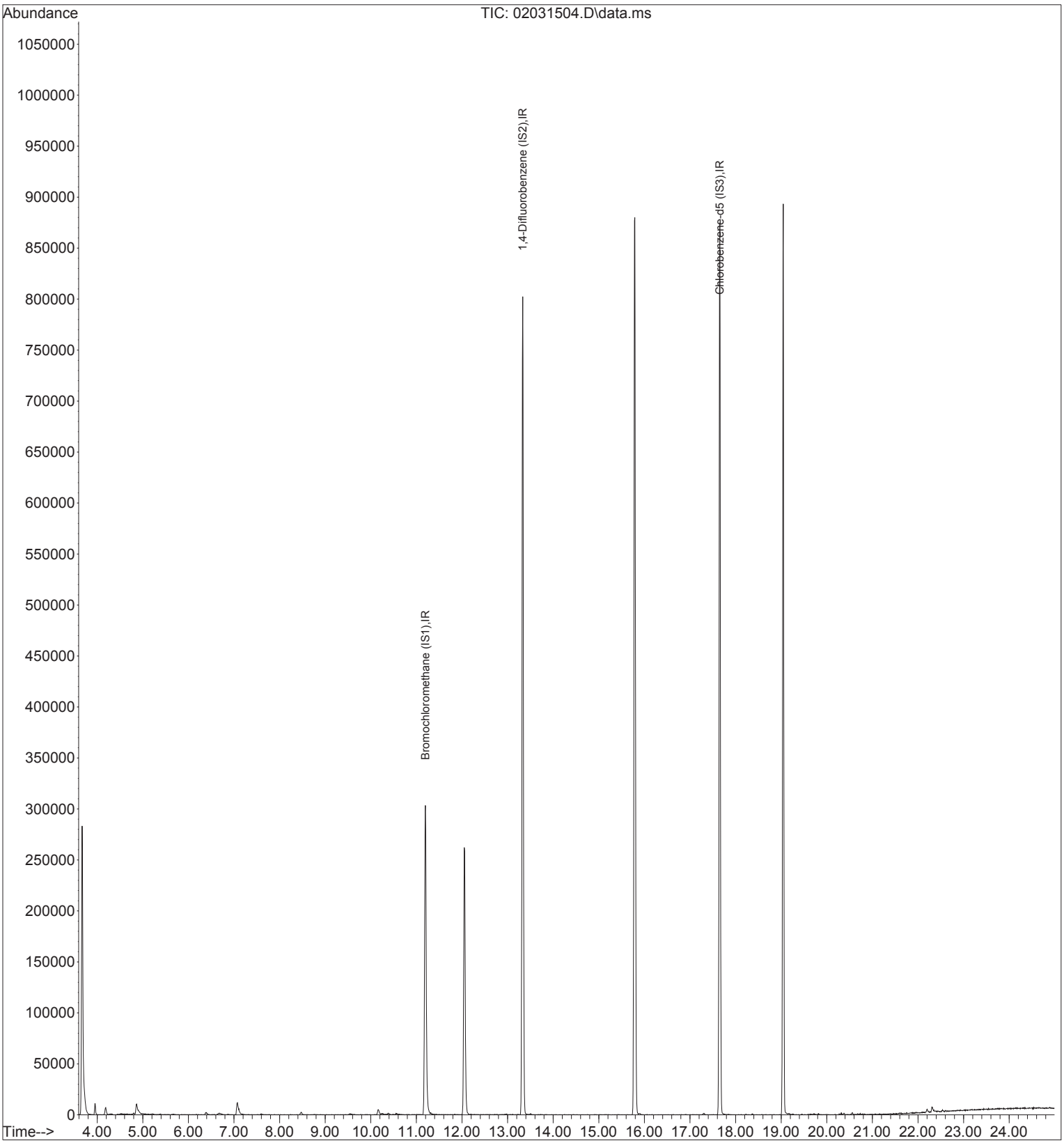
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	175451	12.500	ng	-0.01
16) 1,4-Difluorobenzene (IS2)	13.33	114	859870	12.500	ng	-0.01
19) Chlorobenzene-d5 (IS3)	17.65	82	301123	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.85	85	59	N.D.		
3) 1,1,1,2-Tetrafluoroeth...	0.00	83	0	N.D.		
4) 1,1-Difluoroethane	0.00	65	0	N.D.		
5) Chlorodifluoromethane ...	0.00	67	0	N.D.		
6) 1-Chloro-1,1-Difluoroe...	4.60	65	53	N.D.		
7) Dichlorofluoromethane ...	6.28	67	53	N.D.		
8) Vinylbromide	0.00	108	0	N.D.		
9) 2,2-Dichloro-1,1,1-tri...	0.00	83	0	N.D.		
10) 2-Methylbutane	7.11	57	974	N.D.		
11) Methyl Acetate	0.00	43	0	N.D.		
12) 2-Methylpentane	0.00	71	0	N.D.		
13) 2,2-Dichloropropane	0.00	77	0	N.D.		
14) 1,1-Dichloropropene	0.00	75	0	N.D.		
15) Thiophene	13.07	84	173	N.D.		
17) 2,3-Dimethylpentane	13.51	56	378	N.D.		
18) Dibromomethane	0.00	174	0	N.D.		
20) Methyl Cyclohexane	15.01	55	51	N.D.		
21) 1,3-Dichloropropane	0.00	76	0	N.D.	d	
22) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.		
23) 1-Chlorohexane	0.00	91	0	N.D.		
24) 1,2,3-Trichloropropane	18.75	75	102	N.D.		
25) Bromobenzene	19.26	77	373	N.D.		
26) 2-Chlorotoluene	19.66	91	1821	N.D.		
27) 4-Chlorotoluene	19.66	91	1821	N.D.		
28) Indan	20.73	117	481	N.D.		
29) Indene	20.82	115	355	N.D.		
30) 1,2,4,5-Tetramethylben...	21.58	119	591	N.D.		
31) 1,2,3,4-Tetramethylben...	21.62	119	446	N.D.		
32) 1,2,3,5-Tetramethylben...	21.96	119	520	N.D.		
33) 1,2,3-Trichlorobenzene	22.54	180	947	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031504.D
Acq On : 3 Feb 2015 2:47 Operator: LH
Sample : MB R16020315_1000mL
Misc : S29-01071501
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 03 09:19:05 2015
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : ed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031505.D
Acq On : 3 Feb 2015 3:21 Operator: LH
Sample : LCS R16020315_25ng
Misc : S29-01071501/S29-01291507 (2/27)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Feb 03 06:34:15 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 2/3/15

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.21	130	185053	12.500	ng		0.01
37) 1,4-Difluorobenzene (IS2)	13.34	114	851569	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	307709	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.07	65	202988	12.683	ng		0.02
Spiked Amount 12.500			Recovery = 101.44%				
57) Toluene-d8 (SS2)	15.79	98	725573	12.012	ng		0.00
Spiked Amount 12.500			Recovery = 96.08%				
73) Bromofluorobenzene (SS3)	19.04	174	365336	12.395	ng		0.00
Spiked Amount 12.500			Recovery = 99.20%				
Target Compounds							Qvalue
2) Propene	4.10	42	397457	23.980	ng		100
3) Dichlorodifluoromethan...	4.26	85	940260	25.816	ng		100
4) Chloromethane	4.54	50	604222	24.573	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.81	135	585958	26.423	ng		99
6) Vinyl Chloride	4.97	62	640687	25.593	ng		100
7) 1,3-Butadiene	5.23	54	471245	30.903	ng		99
8) Bromomethane	5.68	94	519669	27.852	ng		99
9) Chloroethane	6.01	64	356063	26.155	ng		99
10) Ethanol	6.39	45	1456486	126.778	ng		100
11) Acetonitrile	6.64	41	770870	26.881	ng		100
12) Acrolein	6.83	56	303166	30.007	ng		100
13) Acetone	7.04	58	1648214	132.866	ng		98
14) Trichlorofluoromethane	7.28	101	736783	27.715	ng		100
15) 2-Propanol (Isopropanol)	7.54	45	2059890	52.555	ng		100
16) Acrylonitrile	7.80	53	612633	27.903	ng		100
17) 1,1-Dichloroethene	8.24	96	502496	27.289	ng		99
18) 2-Methyl-2-Propanol (t...	8.41	59	2125956	52.853	ng		99
19) Methylene Chloride	8.48	84	521859	27.109	ng		99
20) 3-Chloro-1-propene (Al...	8.63	41	561736	31.540	ng		100
21) Trichlorotrifluoroethane	8.89	151	443822	26.131	ng		99
22) Carbon Disulfide	8.73	76	1882595	27.356	ng		100
23) trans-1,2-Dichloroethene	9.76	61	635908	28.698	ng		99
24) 1,1-Dichloroethane	10.01	63	759633	26.677	ng		100
25) Methyl tert-Butyl Ether	10.10	73	1274089	27.428	ng		100
26) Vinyl Acetate	10.27	86	583576	138.714	ng		97
27) 2-Butanone (MEK)	10.51	72	316710	26.579	ng		97
28) cis-1,2-Dichloroethene	11.03	61	591134	28.067	ng		99
29) Diisopropyl Ether	11.33	87	454348	27.503	ng	#	93
30) Ethyl Acetate	11.33	61	321302	53.153	ng		100
31) n-Hexane	11.31	57	584947	24.690	ng		100
32) Chloroform	11.38	83	782367	27.546	ng		100
34) Tetrahydrofuran (THF)	11.78	72	299900	24.673	ng		99
35) Ethyl tert-Butyl Ether	11.92	87	550571	27.568	ng		99
36) 1,2-Dichloroethane	12.18	62	465483	26.994	ng		100
38) 1,1,1-Trichloroethane	12.46	97	650821	26.297	ng		100
39) Isopropyl Acetate	12.89	61	558438	55.936	ng		98
40) 1-Butanol	12.91	56	885049	53.334	ng		98
41) Benzene	12.94	78	1800046	26.056	ng		100
42) Carbon Tetrachloride	13.10	117	602006	29.200	ng		100
43) Cyclohexane	13.23	84	1413326	53.024	ng		99
44) tert-Amyl Methyl Ether	13.58	73	1268000	26.641	ng		99
45) 1,2-Dichloropropane	13.79	63	443301	26.964	ng		100
46) Bromodichloromethane	13.99	83	609587	27.622	ng		100
47) Trichloroethene	14.04	130	578786	27.016	ng		100
48) 1,4-Dioxane	14.01	88	411268	25.003	ng		99
49) 2,2,4-Trimethylpentane...	14.11	57	1750222	25.659	ng		100

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031505.D
Acq On : 3 Feb 2015 3:21 Operator: LH
Sample : LCS R16020315_25ng
Misc : S29-01071501/S29-01291507 (2/27)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Feb 03 06:34:15 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

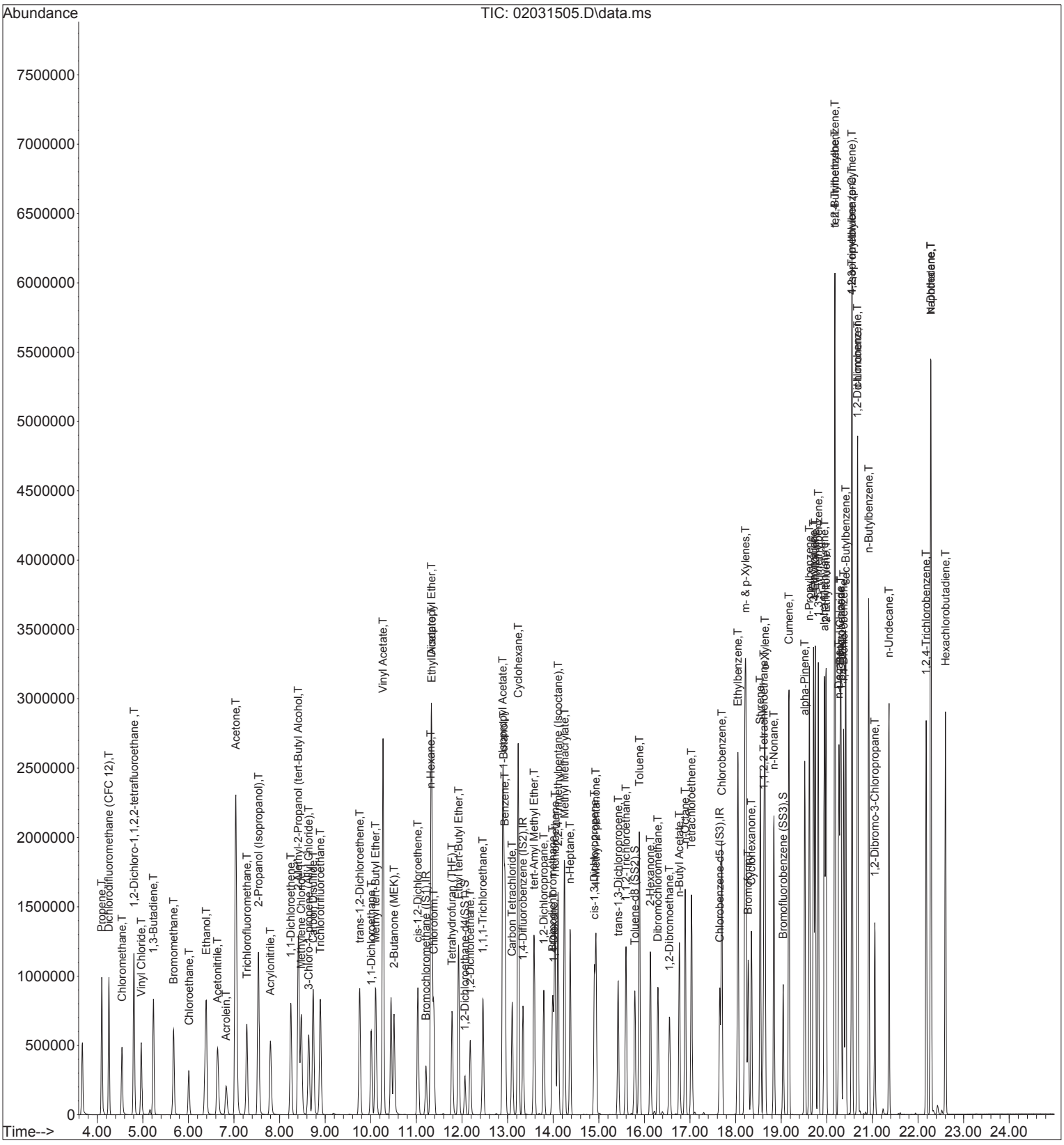
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	14.25	100	409737	54.999	ng	99
51) n-Heptane	14.37	71	410709	26.509	ng	99
52) cis-1,3-Dichloropropene	14.90	75	764226	30.130	ng	100
53) 4-Methyl-2-pentanone	14.94	58	439370	29.324	ng	98
54) trans-1,3-Dichloropropene	15.43	75	677500	31.539	ng	100
55) 1,1,2-Trichloroethane	15.60	97	511873	27.729	ng	100
58) Toluene	15.89	91	1883914	23.981	ng	100
59) 2-Hexanone	16.13	43	889268	27.507	ng	99
60) Dibromochloromethane	16.30	129	651972	29.966	ng	100
61) 1,2-Dibromoethane	16.55	107	613010	29.023	ng	100
62) n-Butyl Acetate	16.77	43	1016136	27.866	ng	99
63) n-Octane	16.89	57	341055	26.191	ng	99
64) Tetrachloroethene	17.03	166	662184	23.917	ng	99
65) Chlorobenzene	17.70	112	1426460	26.793	ng	100
66) Ethylbenzene	18.05	91	2217085	27.446	ng	100
67) m- p- ylenes	18.22	91	3402416	53.223	ng	100
68) Bromoform	18.27	173	654570	32.411	ng	100
69) Styrene	18.54	104	1524126	28.644	ng	100
70) o- ylene	18.64	91	1710770	25.966	ng	100
71) n-Nonane	18.84	43	742459	26.351	ng	99
72) 1,1,2,2-Tetrachloroethane	18.62	83	907244	26.214	ng	100
74) Cumene	19.17	105	2306745	25.476	ng	100
75) alpha-Pinene	19.52	93	1141632	27.787	ng	100
76) n-Propylbenzene	19.62	91	2734733	25.431	ng	100
77) 3-Ethyltoluene	19.71	105	2274941	25.581	ng	100
78) 4-Ethyltoluene	19.75	105	2276149	26.768	ng	100
79) 1,3,5-Trimethylbenzene	19.81	105	1855601	25.496	ng	100
80) alpha-Methylstyrene	19.95	118	1128930	28.430	ng	100
81) 2-Ethyltoluene	19.98	105	2215666	26.063	ng	100
82) 1,2,4-Trimethylbenzene	20.18	105	1851009	25.804	ng	99
83) n-Decane	20.27	57	878481	25.521	ng	100
84) Benzyl Chloride	20.29	91	1740931	31.382	ng	100
85) 1,3-Dichlorobenzene	20.31	146	1326297	26.513	ng	100
86) 1,4-Dichlorobenzene	20.37	146	1329839	24.256	ng	100
87) sec-Butylbenzene	20.41	105	2561178	26.253	ng	100
88) 4-Isopropyltoluene (p-...	20.55	119	2286924	24.380	ng	100
89) 1,2,3-Trimethylbenzene	20.55	105	1901416	24.607	ng	100
90) 1,2-Dichlorobenzene	20.67	146	1255756	25.832	ng	100
91) d-Limonene	20.68	68	659814	28.171	ng	100
92) 1,2-Dibromo-3-Chloropr...	21.05	157	505003	29.312	ng	100
93) n-Undecane	21.37	57	952799	25.938	ng	100
94) 1,2,4-Trichlorobenzene	22.18	180	1067295	28.351	ng	100
95) Naphthalene	22.28	128	3018922	28.189	ng	100
96) n-Dodecane	22.28	57	913895	27.627	ng	100
97) Hexachlorobutadiene	22.60	225	652134	27.098	ng	100
98) Cyclohexanone	18.35	55	632832	29.417	ng	99
99) tert-Butylbenzene	20.18	119	1860709	25.847	ng	100
100) n-Butylbenzene	20.92	91	2037717	26.432	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031505.D
Acq On : 3 Feb 2015 3:21 Operator: LH
Sample : LCS R16020315_25ng
Misc : S29-01071501/S29-01291507 (2/27)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Feb 03 06:34:15 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Response Factor Report GCMS-16

Method Path : I:\MS16\METHODS\
Method File : R16112414.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Nov 25 09:22:10 2014
Response Via : Initial Calibration

Calibration Files
0.08=11241413.D 0.10=11241414.D 0.20=11241431.D 0.40=11241432.D 1.0 =11241417.D 5.0 =11241418.D
25 =11241419.D 50 =11241420.D 100 =11241421.D

		Compound	0.08	0.10	0.20	0.40	1.0	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------			ISTD	----------						
2)	T	Propene	1.083	1.060	1.616	1.184	1.137	1.048	1.037	1.027	0.884	1.120	18.20
3)	T	Dichlorodifluo...	2.222	2.343	2.812	2.654	2.634	2.365	2.530	2.408	2.174	2.460	8.63
4)	T	Chloromethane	1.579	1.546	1.999	1.714	1.834	1.576	1.719	1.621	1.359	1.661	11.07
5)	T	1,2-Dichloro-1...	1.287	1.399	1.826	1.523	1.586	1.481	1.479	1.518	1.383	1.498	10.15
6)	T	Vinyl Chloride	1.428	1.443	1.939	1.751	1.815	1.689	1.783	1.785	1.586	1.691	10.23
7)	T	1,3-Butadiene	0.743	0.747	1.198	1.028	1.116	1.055	1.140	1.173	1.070	1.030	16.58
8)	T	Bromomethane	1.067	1.088	1.424	1.315	1.415	1.206	1.379	1.282	1.169	1.260	10.74
9)	T	Chloroethane	0.787	0.822	1.015	0.933	1.034	0.886	1.012	0.956	0.832	0.920	10.05
10)	T	Ethanol				0.866	0.855	0.765	0.777	0.744	0.650	0.776	10.22
11)	T	Acetonitrile				2.053	2.065	1.861	1.962	1.915	1.766	1.937	5.93
12)	T	Acrolein	0.836	0.597	0.806	0.575	0.655	0.659	0.702	0.690	0.623	0.682	12.98
13)	T	Acetone				0.946	0.940	0.846	0.828	0.795	0.674	0.838	12.07
14)	T	Trichlorofluor...	1.642	1.696	2.121	1.870	1.962	1.697	1.770	1.788	1.616	1.796	9.14
15)	T	2-Propanol (Is...	2.969	2.783	2.954	2.586	2.675	2.557	2.657	2.534	2.113	2.648	9.70
16)	T	Acrylonitrile	1.337	0.982	1.922	1.476	1.565	1.482	1.605	1.551	1.427	1.483	16.76
17)	T	1,1-Dichloroet...	1.044	1.115	1.348	1.250	1.363	1.265	1.334	1.293	1.182	1.244	8.82
18)	T	2-Methyl-2-Pro...	3.249	3.098	2.895	2.638	2.724	2.562	2.788	2.551	1.947	2.717	13.74
19)	T	Methylene Chlo...				1.448	1.429	1.257	1.284	1.262	1.123	1.300	9.32
20)	T	3-Chloro-1-pro...	0.895	0.951	1.309	1.146	1.273	1.235	1.393	1.382	1.244	1.203	14.65
21)	T	Trichlorotrifl...	1.097	1.053	1.509	1.139	1.268	1.063	1.145	1.035	1.016	1.147	13.58
22)	T	Carbon Disulfide			5.352	4.558	4.814	4.416	4.691	4.590	4.120	4.649	8.19
23)	T	trans-1,2-Dich...	1.226	1.339	1.634	1.485	1.607	1.534	1.594	1.592	1.459	1.497	9.16
24)	T	1,1-Dichloroet...	1.726	1.764	2.205	1.941	2.081	1.883	1.942	1.948	1.822	1.923	7.83
25)	T	Methyl tert-Bu...	2.883	2.732	3.541	3.122	3.451	3.106	3.277	3.231	2.897	3.138	8.56
26)	T	Vinyl Acetate	0.250	0.234	0.306	0.287	0.315	0.297	0.305	0.294	0.269	0.284	9.65
27)	T	2-Butanone (MEK)			1.042	0.753	0.778	0.758	0.793	0.785	0.725	0.805	13.30
28)	T	cis-1,2-Dichlo...	1.189	1.314	1.614	1.446	1.547	1.387	1.493	1.456	1.359	1.423	8.96
29)	T	Diisopropyl Ether	1.045	1.032	1.250	1.137	1.270	1.109	1.142	1.089	0.969	1.116	8.81
30)	T	Ethyl Acetate	0.492	0.307	0.525	0.414	0.418	0.396	0.407	0.385	0.333	0.408	16.74
31)	T	n-Hexane	1.800	1.743	1.971	1.696	1.665	1.507	1.382	1.363	1.274	1.600	14.49
32)	T	Chloroform	1.798	1.778	2.107	2.012	2.077	1.886	1.950	1.899	1.759	1.919	6.69
33)	S	1,2-Dichloroet...	1.111	1.071	1.066	1.108	1.075	1.060	1.066	1.088	1.084	1.081	1.70
34)	T	Tetrahydrofura...	0.837	0.836	1.092	0.767	0.833	0.752	0.786	0.771	0.716	0.821	13.39
35)	T	Ethyl tert-But...	1.132	1.162	1.556	1.347	1.497	1.375	1.430	1.377	1.266	1.349	10.54
36)	T	1,2-Dichloroet...	1.079	0.992	1.310	1.201	1.288	1.135	1.185	1.179	1.115	1.165	8.52
37)	IR	1,4-Difluorobenzen...	----------			ISTD	----------						
38)	T	1,1,1-Trichlor...	0.320	0.322	0.410	0.359	0.406	0.369	0.382	0.361	0.341	0.363	9.00

MH 11/25/14

Method Path : I:\MS16\METHODS\
Method File : R16112414.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

39)	T	Isopropyl Acetate	0.145	0.139	0.171	0.150	0.158	0.145	0.151	0.138	0.122	0.147	9.36
40)	T	1-Butanol		0.275	0.329	0.209	0.234	0.247	0.240	0.223	0.192	0.244	17.39
41)	T	Benzene	1.038	1.034	1.223	1.076	1.112	0.987	0.971	0.892	0.794	1.014	12.26
42)	T	Carbon Tetrach...	0.246	0.261	0.351	0.305	0.337	0.308	0.321	0.306	0.288	0.303	11.09
43)	T	Cyclohexane	0.360	0.373	0.448	0.391	0.427	0.418	0.399	0.375	0.331	0.391	9.25
44)	T	tert-Amyl Meth...	0.624	0.631	0.786	0.745	0.738	0.702	0.735	0.695	0.633	0.699	8.35
45)	T	1,2-Dichloropr...	0.209	0.227	0.276	0.246	0.263	0.241	0.251	0.238	0.221	0.241	8.62
46)	T	Bromodichlorom...	0.291	0.275	0.349	0.330	0.350	0.323	0.354	0.337	0.307	0.324	8.52
47)	T	Trichloroethene	0.268	0.277	0.355	0.324	0.359	0.318	0.323	0.310	0.295	0.314	9.94
48)	T	1,4-Dioxane	0.276	0.256	0.268	0.232	0.243	0.236	0.239	0.225	0.198	0.241	9.69
49)	T	2,2,4-Trimethy...	0.952	0.931	1.137	1.035	1.162	1.034	1.004	0.931	0.825	1.001	10.58
50)	T	Methyl Methacr...	0.093	0.087	0.127	0.108	0.119	0.115	0.120	0.114	0.102	0.109	12.20
51)	T	n-Heptane	0.205	0.228	0.254	0.239	0.264	0.229	0.224	0.206	0.198	0.227	9.75
52)	T	cis-1,3-Dichlo...	0.286	0.296	0.403	0.390	0.400	0.383	0.420	0.405	0.367	0.372	13.04
53)	T	4-Methyl-2-pen...	0.215	0.220	0.237	0.206	0.228	0.221	0.241	0.216	0.193	0.220	6.75
54)	T	trans-1,3-Dich...	0.224	0.224	0.340	0.306	0.339	0.345	0.375	0.361	0.324	0.315	17.57
55)	T	1,1,2-Trichlor...	0.227	0.236	0.313	0.287	0.297	0.276	0.290	0.271	0.242	0.271	11.00
56)	IR	Chlorobenzene-d5 (...	----------	----------	----------	ISTD	----------	----------	----------	----------	----------	----------	
57)	S	Toluene-d8 (SS2)	2.490	2.417	2.520	2.506	2.455	2.404	2.422	2.442	2.427	2.454	1.70
58)	T	Toluene	3.186	3.065	4.568	3.269	3.335	2.883	2.996	2.842	2.577	3.191	17.76
59)	T	2-Hexanone				1.244	1.417	1.399	1.351	1.300	1.168	1.313	7.26
60)	T	Dibromochlorom...	0.771	0.755	0.953	0.848	0.946	0.905	0.983	0.932	0.861	0.884	9.13
61)	T	1,2-Dibromoethane	0.690	0.720	0.978	0.855	0.938	0.891	0.931	0.897	0.824	0.858	11.45
62)	T	n-Butyl Acetate		1.412	2.038	1.307	1.475	1.479	1.467	1.407	1.264	1.481	16.11
63)	T	n-Octane	0.463	0.485	0.606	0.557	0.587	0.531	0.545	0.514	0.472	0.529	9.49
64)	T	Tetrachloroethene	1.107	1.043	1.273	1.163	1.229	1.090	1.127	1.088	1.002	1.125	7.66
65)	T	Chlorobenzene	2.116	2.128	2.553	2.166	2.306	2.094	2.175	2.055	1.872	2.163	8.60
66)	T	Ethylbenzene	3.047	2.893	3.841	3.306	3.523	3.339	3.452	3.244	2.890	3.282	9.42
67)	T	m- & p-Xylenes	2.378	2.271	3.172	2.670	2.798	2.673	2.676	2.519	2.215	2.597	11.34
68)	T	Bromoform	0.712	0.655	0.823	0.776	0.894	0.851	0.927	0.911	0.834	0.820	11.19
69)	T	Styrene	1.925	1.972	2.446	2.012	2.423	2.276	2.288	2.178	1.933	2.162	9.60
70)	T	o-Xylene	2.474	2.410	3.132	2.728	3.010	2.784	2.721	2.568	2.261	2.676	10.50
71)	T	n-Nonane	1.065	1.069	1.302	1.178	1.335	1.196	1.170	1.077	0.909	1.145	11.45
72)	T	1,1,2,2-Tetrac...	1.333	1.218	1.557	1.397	1.623	1.468	1.488	1.369	1.201	1.406	10.19
73)	S	Bromofluoroben...	1.181	1.177	1.178	1.171	1.259	1.233	1.182	1.200	1.194	1.197	2.49
74)	T	Cumene	3.707	3.470	4.157	3.613	4.133	3.722	3.734	3.541	3.027	3.678	9.28
75)	T	alpha-Pinene	1.484	1.382	1.856	1.647	1.839	1.796	1.801	1.713	1.502	1.669	10.47
76)	T	n-Propylbenzene	4.391	4.114	5.083	4.333	4.850	4.438	4.423	4.121	3.561	4.368	10.01
77)	T	3-Ethyltoluene	3.911	3.548	4.089	3.491	3.960	3.624	3.545	3.476	2.869	3.613	9.94
78)	T	4-Ethyltoluene	3.294	3.066	4.176	3.569	3.989	3.497	3.598	3.084	2.815	3.454	12.80
79)	T	1,3,5-Trimethy...	3.061	2.817	3.383	2.964	3.367	2.932	2.978	2.733	2.373	2.957	10.51
80)	T	alpha-Methylst...	1.457	1.439	1.805	1.519	1.842	1.718	1.746	1.605	1.387	1.613	10.58
81)	T	2-Ethyltoluene	3.439	3.343	3.897	3.468	4.023	3.487	3.500	3.192	2.732	3.453	10.86
82)	T	1,2,4-Trimethy...	3.015	2.807	3.423	2.931	3.343	2.938	2.941	2.636	2.195	2.914	12.50
83)	T	n-Decane	1.432	1.252	1.772	1.414	1.630	1.416	1.390	1.245	1.032	1.398	15.46
84)	T	Benzyl Chloride	1.895	1.675	2.686	2.097	2.456	2.481	2.554	2.388	2.051	2.254	15.02
85)	T	1,3-Dichlorobe...	2.066	1.915	2.656	1.995	2.269	1.985	2.006	1.833	1.563	2.032	14.81
86)	T	1,4-Dichlorobe...	2.465	2.187	2.946	2.134	2.375	2.136	2.127	1.970	1.705	2.227	15.58

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Method Path : I:\MS16\METHODS\
Method File : R16112414.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

87)	T	sec-Butylbenzene	4.036	3.955	4.472	4.012	4.589	4.023	3.987	3.584	3.011	3.963	11.68
88)	T	4-Isopropyltol...	4.341	4.063	4.396	3.791	4.375	3.860	3.642	3.219	2.608	3.811	15.62
89)	T	1,2,3-Trimethy...	3.444	3.296	3.700	3.069	3.534	3.142	3.052	2.739	2.273	3.139	13.84
90)	T	1,2-Dichlorobe...	2.054	1.958	2.502	1.932	2.226	1.985	1.921	1.751	1.444	1.975	14.81
91)	T	d-Limonene	0.824	0.837	1.055	0.974	1.138	1.073	1.026	0.909	0.728	0.951	14.25
92)	T	1,2-Dibromo-3-...	0.611	0.535	0.822	0.625	0.763	0.742	0.781	0.748	0.671	0.700	13.51
93)	T	n-Undecane	1.767	1.495	1.648	1.388	1.658	1.534	1.486	1.350	1.103	1.492	13.24
94)	T	1,2,4-Trichlor...				1.487	1.612	1.567	1.598	1.532	1.379	1.529	5.65
95)	T	Naphthalene				4.504	4.905	4.672	4.511	4.131	3.380	4.351	12.38
96)	T	n-Dodecane		1.675	1.633	1.240	1.453	1.388	1.300	1.160	0.902	1.344	18.85
97)	T	Hexachlorobuta...	1.017	0.994	1.084	0.911	1.068	0.957	0.976	0.940	0.850	0.978	7.59
98)	T	Cyclohexanone				0.879	0.948	0.905	0.890	0.851	0.770	0.874	6.88
99)	T	tert-Butylbenzene	3.016	2.915	3.360	2.956	3.433	2.956	2.927	2.596	2.158	2.924	12.99
100)	T	n-Butylbenzene	3.565	3.320	3.594	2.990	3.431	3.150	3.016	2.800	2.320	3.132	13.02

(#) = Out of Range

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HH 11/25/14

Primary Source Standards Concentrations
(Working & Initial Calibration)

0.2ng/L Std. ID:
1ng/L Std. ID: S29-10281402
4ng/L Std. ID: S29-11201408
20ng/L Std. ID: S29-11201407
200ng/L Std. ID: S29-11201403

Dilution Factors:		5	50	250	1000	5000	Working STD Conc.(ng/L):	ICAL Concentrations (Primary Source)												
								NA	NA	NA	NA	1	1	4	4	20	20	200	200	200
	Source Std.	Primary Working Standards					Injection (L):	NA	NA	NA	NA	0.080	0.100	0.050	0.100	0.050	0.25	0.125	0.25	0.50
Compounds	mg/m³	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L	ICAL Points:	0.005ng	0.01ng	0.02ng	0.05ng	0.08ng	0.1ng	0.2ng	0.4ng	1ng	5ng	25ng	50ng	100ng
Propene	0.99	198	19.8	3.96	0.99	0.198		NA	NA	NA	NA	0.0792	0.099	0.198	0.396	0.99	4.95	24.75	49.5	99
Dichlorodifluoromethane	0.95	190	19.0	3.80	0.95	0.190		NA	NA	NA	NA	0.0760	0.095	0.190	0.380	0.95	4.75	23.75	47.5	95
Chloromethane	1.01	202	20.2	4.04	1.01	0.202		NA	NA	NA	NA	0.0808	0.101	0.202	0.404	1.01	5.05	25.25	50.5	101
Freon-114	1.02	204	20.4	4.08	1.02	0.204		NA	NA	NA	NA	0.0816	0.102	0.204	0.408	1.02	5.10	25.50	51.0	102
Vinyl Chloride	1.00	200	20.0	4.00	1.00	0.200		NA	NA	NA	NA	0.0800	0.100	0.200	0.400	1.00	5.00	25.00	50.0	100
1,3-Butadiene	1.04	208	20.8	4.16	1.04	0.208		NA	NA	NA	NA	0.0832	0.104	0.208	0.416	1.04	5.20	26.00	52.0	104
Bromomethane	1.02	204	20.4	4.08	1.02	0.204		NA	NA	NA	NA	0.0816	0.102	0.204	0.408	1.02	5.10	25.50	51.0	102
Chloroethane	1.01	202	20.2	4.04	1.01	0.202		NA	NA	NA	NA	0.0808	0.101	0.202	0.404	1.01	5.05	25.25	50.5	101
Ethanol	5.16	1032	103.2	20.64	5.16	1.032		NA	NA	NA	NA	0.4128	0.516	1.032	2.064	5.16	25.80	129.00	258.0	516
Acetonitrile	1.06	212	21.2	4.24	1.06	0.212		NA	NA	NA	NA	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
Acrolein	1.13	226	22.6	4.52	1.13	0.226		NA	NA	NA	NA	0.0904	0.113	0.226	0.452	1.13	5.65	28.25	56.5	113
Acetone	5.46	1092	109.2	21.84	5.46	1.092		NA	NA	NA	NA	0.4368	0.546	1.092	2.184	5.46	27.30	136.50	273.0	546
Trichlorofluoromethane	1.08	216	21.6	4.32	1.08	0.216		NA	NA	NA	NA	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
Isopropanol	2.14	428	42.8	8.56	2.14	0.428		NA	NA	NA	NA	0.1712	0.214	0.428	0.856	2.14	10.70	53.50	107.0	214
Acrylonitrile	1.06	212	21.2	4.24	1.06	0.212		NA	NA	NA	NA	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
1,1-Dichloroethene	1.09	218	21.8	4.36	1.09	0.218		NA	NA	NA	NA	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
tert-Butanol	2.14	428	42.8	8.56	2.14	0.428		NA	NA	NA	NA	0.1712	0.214	0.428	0.856	2.14	10.70	53.50	107.0	214
Methylene Chloride	1.13	226	22.6	4.52	1.13	0.226		NA	NA	NA	NA	0.0904	0.113	0.226	0.452	1.13	5.65	28.25	56.5	113
Allyl Chloride	1.09	218	21.8	4.36	1.09	0.218		NA	NA	NA	NA	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
Trichlorotrifluoroethane	1.09	218	21.8	4.36	1.09	0.218		NA	NA	NA	NA	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
Carbon Disulfide	1.05	210	21.0	4.20	1.05	0.210		NA	NA	NA	NA	0.0840	0.105	0.210	0.420	1.05	5.25	26.25	52.5	105
trans-1,2-Dichloroethene	1.06	212	21.2	4.24	1.06	0.212		NA	NA	NA	NA	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
1,1-Dichloroethane	1.07	214	21.4	4.28	1.07	0.214		NA	NA	NA	NA	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
Methyl tert-Butyl Ether	1.09	218	21.8	4.36	1.09	0.218		NA	NA	NA	NA	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
Vinyl Acetate	5.25	1050	105.0	21.00	5.25	1.050		NA	NA	NA	NA	0.4200	0.525	1.050	2.100	5.25	26.25	131.25	262.5	525
2-Butanone	1.11	222	22.2	4.44	1.11	0.222		NA	NA	NA	NA	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
cis-1,2-Dichloroethene	1.10	220	22.0	4.40	1.10	0.220		NA	NA	NA	NA	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
Diisopropyl Ether	1.10	220	22.0	4.40	1.10	0.220		NA	NA	NA	NA	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
Ethyl Acetate	2.14	428	42.8	8.56	2.14	0.428		NA	NA	NA	NA	0.1712	0.214	0.428	0.856	2.14	10.70	53.50	107.0	214
n-Hexane	1.07	214	21.4	4.28	1.07	0.214		NA	NA	NA	NA	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
Chloroform	1.12	224	22.4	4.48	1.12	0.224		NA	NA	NA	NA	0.0896	0.112	0.224	0.448	1.12	5.60	28.00	56.0	112
Tetrahydrofuran	1.11	222	22.2	4.44	1.11	0.222		NA	NA	NA	NA	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
Ethyl tert-Butyl Ether	1.08	216	21.6	4.32	1.08	0.216		NA	NA	NA	NA	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
1,2-Dichloroethane	1.08	216	21.6	4.32	1.08	0.216		NA	NA	NA	NA	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
1,1,1-Trichloroethane	1.05	210	21.0	4.20	1.05	0.210		NA	NA	NA	NA	0.0840	0.105	0.210	0.420	1.05	5.25	26.25	52.5	105
Isopropyl Acetate	2.29	458	45.8	9.16	2.29	0.458		NA	NA	NA	NA	0.1832	0.229	0.458	0.916	2.29	11.45	57.25	114.5	229
1-Butanol	2.28	456	45.6	9.12	2.28	0.456		NA	NA	NA	NA	0.1824	0.228	0.456	0.912	2.28	11.40	57.00	114.0	228
Benzene	1.13	226	22.6	4.52	1.13	0.226		NA	NA	NA	NA	0.0904	0.113	0.226	0.452	1.13	5.65	28.25	56.5	113
Carbon Tetrachloride	1.15	230	23.0	4.60	1.15	0.230		NA	NA	NA	NA	0.0920	0.115	0.230	0.460	1.15	5.75	28.75	57.5	115
Cyclohexane	2.14	428	42.8	8.56	2.14	0.428		NA	NA	NA	NA	0.1712	0.214	0.428	0.856	2.14	10.70	53.50	107.0	214
tert-Amyl Methyl Ether	1.07	214	21.4	4.28	1.07	0.214		NA	NA	NA	NA	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
1,2-Dichloropropane	1.09	218	21.8	4.36	1.09	0.218		NA	NA	NA	NA	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
Bromodichloromethane	1.09	218	21.8	4.36	1.09	0.218		NA	NA	NA	NA	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
Trichloroethene	1.08	216	21.6	4.32	1.08	0.216		NA	NA	NA	NA	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
1,4-Dioxane	1.09	218	21.8	4.36	1.09	0.218		NA	NA	NA	NA	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
Isooctane	1.07	214	21.4	4.28	1.07	0.214		NA	NA	NA	NA	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
Methyl Methacrylate	2.14	428	42.8	8.56	2.14	0.428		NA	NA	NA	NA	0.1712	0.214	0.428	0.856	2.14	10.70	53.50	107.0	214

LH 11/05/14

Primary Source Standards Concentrations
(Working & Initial Calibration)

0.2ng/L Std. ID:
1ng/L Std. ID: S29-10261402
4ng/L Std. ID: S29-11201408
20ng/L Std. ID: S29-11201407
200ng/L Std. ID: S29-11201403

Dilution Factors:		5	50	250	1000	5000
	Source Std.	Primary Working Standards				
Compounds	mg/m³	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L
n-Heptane	1.09	218	21.8	4.36	1.09	0.218
cis-1,3-Dichloropropene	1.05	210	21.0	4.20	1.05	0.210
4-Methyl-2-pentanone	1.11	222	22.2	4.44	1.11	0.222
trans-1,3-Dichloropropene	1.06	212	21.2	4.24	1.06	0.212
1,1,2-Trichloroethane	1.09	218	21.8	4.36	1.09	0.218
Toluene	1.10	220	22.0	4.40	1.10	0.220
2-Hexanone	1.10	220	22.0	4.40	1.10	0.220
Dibromochloromethane	1.10	220	22.0	4.40	1.10	0.220
1,2-Dibromoethane	1.10	220	22.0	4.40	1.10	0.220
n-Butyl Acetate	1.16	232	23.2	4.64	1.16	0.232
n-Octane	1.06	212	21.2	4.24	1.06	0.212
Tetrachloroethene	1.01	202	20.2	4.04	1.01	0.202
Chlorobenzene	1.11	222	22.2	4.44	1.11	0.222
Ethylbenzene	1.10	220	22.0	4.40	1.10	0.220
m-&p-Xylene	2.16	432	43.2	8.64	2.16	0.432
Bromoform	1.14	228	22.8	4.56	1.14	0.228
Styrene	1.12	224	22.4	4.48	1.12	0.224
o-Xylene	1.06	212	21.2	4.24	1.06	0.212
n-Nonane	1.04	208	20.8	4.16	1.04	0.208
1,1,2,2-Tetrachloroethane	1.05	210	21.0	4.20	1.05	0.210
Cumene	1.04	208	20.8	4.16	1.04	0.208
alpha-Pinene	1.07	214	21.4	4.28	1.07	0.214
n-Propylbenzene	1.03	206	20.6	4.12	1.03	0.206
3-Ethyltoluene	1.08	216	21.6	4.32	1.08	0.216
4-Ethyltoluene	1.08	216	21.6	4.32	1.08	0.216
1,3,5-Trimethylbenzene	1.07	214	21.4	4.28	1.07	0.214
alpha-Methylstyrene	1.08	216	21.6	4.32	1.08	0.216
2-Ethyltoluene	1.08	216	21.6	4.32	1.08	0.216
1,2,4-Trimethylbenzene	1.09	218	21.8	4.36	1.09	0.218
n-Decane	1.06	212	21.2	4.24	1.06	0.212
Benzyl Chloride	1.14	228	22.8	4.56	1.14	0.228
1,3-Dichlorobenzene	1.14	228	22.8	4.56	1.14	0.228
1,4-Dichlorobenzene	1.06	212	21.2	4.24	1.06	0.212
sec-Butylbenzene	1.09	218	21.8	4.36	1.09	0.218
p-Isopropyltoluene	1.07	214	21.4	4.28	1.07	0.214
1,2,3-Trimethylbenzene	1.06	212	21.2	4.24	1.06	0.212
1,2-Dichlorobenzene	1.11	222	22.2	4.44	1.11	0.222
d-Limonene	1.07	214	21.4	4.28	1.07	0.214
1,2-Dibromo-3-chloropropane	1.10	220	22.0	4.40	1.10	0.220
n-Undecane	1.04	208	20.8	4.16	1.04	0.208
1,2,4-Trichlorobenzene	1.13	226	22.6	4.52	1.13	0.226
Naphthalene	1.11	222	22.2	4.44	1.11	0.222
n-Dodecane	1.13	226	22.6	4.52	1.13	0.226
Hexachloro-1,3-butadiene	1.12	224	22.4	4.48	1.12	0.224
Methacrylonitrile	1.07	214	21.4	4.28	1.07	0.214
Cyclohexanone	1.18	236	23.6	4.72	1.18	0.236
tert-Butylbenzene	1.08	216	21.6	4.32	1.08	0.216
n-Butylbenzene	1.12	224	22.4	4.48	1.12	0.224

Working STD Conc.(ng/L):	ICAL Concentrations (Primary Source)												
	NA	NA	NA	NA	1	1	4	4	20	20	200	200	200
Injection (L):	NA	NA	NA	NA	0.080	0.100	0.050	0.100	0.050	0.25	0.125	0.25	0.50
ICAL Points:	0.005ng	0.01ng	0.02ng	0.05ng	0.08ng	0.1ng	0.2ng	0.4ng	1ng	5ng	25ng	50ng	100ng
	NA	NA	NA	NA	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
	NA	NA	NA	NA	0.0840	0.105	0.210	0.420	1.05	5.25	26.25	52.5	105
	NA	NA	NA	NA	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
	NA	NA	NA	NA	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
	NA	NA	NA	NA	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
	NA	NA	NA	NA	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
	NA	NA	NA	NA	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
	NA	NA	NA	NA	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
	NA	NA	NA	NA	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
	NA	NA	NA	NA	0.0928	0.116	0.232	0.464	1.16	5.80	29.00	58.0	116
	NA	NA	NA	NA	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
	NA	NA	NA	NA	0.0808	0.101	0.202	0.404	1.01	5.05	25.25	50.5	101
	NA	NA	NA	NA	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
	NA	NA	NA	NA	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
	NA	NA	NA	NA	0.1728	0.216	0.432	0.864	2.16	10.80	54.00	108.0	216
	NA	NA	NA	NA	0.0912	0.114	0.228	0.456	1.14	5.70	28.50	57.0	114
	NA	NA	NA	NA	0.0896	0.112	0.224	0.448	1.12	5.60	28.00	56.0	112
	NA	NA	NA	NA	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
	NA	NA	NA	NA	0.0832	0.104	0.208	0.416	1.04	5.20	26.00	52.0	104
	NA	NA	NA	NA	0.0840	0.105	0.210	0.420	1.05	5.25	26.25	52.5	105
	NA	NA	NA	NA	0.0832	0.104	0.208	0.416	1.04	5.20	26.00	52.0	104
	NA	NA	NA	NA	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
	NA	NA	NA	NA	0.0824	0.103	0.206	0.412	1.03	5.15	25.75	51.5	103
	NA	NA	NA	NA	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
	NA	NA	NA	NA	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
	NA	NA	NA	NA	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
	NA	NA	NA	NA	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
	NA	NA	NA	NA	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
	NA	NA	NA	NA	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
	NA	NA	NA	NA	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
	NA	NA	NA	NA	0.0912	0.114	0.228	0.456	1.14	5.70	28.50	57.0	114
	NA	NA	NA	NA	0.0912	0.114	0.228	0.456	1.14	5.70	28.50	57.0	114
	NA	NA	NA	NA	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
	NA	NA	NA	NA	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
	NA	NA	NA	NA	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
	NA	NA	NA	NA	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
	NA	NA	NA	NA	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
	NA	NA	NA	NA	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
	NA	NA	NA	NA	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
	NA	NA	NA	NA	0.0832	0.104	0.208	0.416	1.04	5.20	26.00	52.0	104
	NA	NA	NA	NA	0.0904	0.113	0.226	0.452	1.13	5.65	28.25	56.5	113
	NA	NA	NA	NA	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
	NA	NA	NA	NA	0.0904	0.113	0.226	0.452	1.13	5.65	28.25	56.5	113
	NA	NA	NA	NA	0.0896	0.112	0.224	0.448	1.12	5.60	28.00	56.0	112
	NA	NA	NA	NA	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
	NA	NA	NA	NA	0.0944	0.118	0.236	0.472	1.18	5.90	29.50	59.0	118
	NA	NA	NA	NA	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
	NA	NA	NA	NA	0.0896	0.112	0.224	0.448	1.12	5.60	28.00	56.0	112

11/25/14

Calibration Status Report GCMS-16

Method : I:\MS16\METHODS\R16112414.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.08	0	13	I:\MS16\DATA\2014_11\24\11241413.D
2	0.10	0	13	I:\MS16\DATA\2014_11\24\11241414.D
3	0.20	0	13	I:\MS16\DATA\2014_11\24\11241431.D
4	0.40	0	13	I:\MS16\DATA\2014_11\24\11241432.D
5	1.0	1	13	I:\MS16\DATA\2014_11\24\11241417.D
6	5.0	5	13	I:\MS16\DATA\2014_11\24\11241418.D
7	25	25	13	I:\MS16\DATA\2014_11\24\11241419.D
8	50	50	13	I:\MS16\DATA\2014_11\24\11241420.D
9	100	99	13	I:\MS16\DATA\2014_11\24\11241421.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.08	Nov 25 07:17 2014	Nov 25 07:07 2014	24 Nov 2014 16:56
2	0.10	Nov 25 07:17 2014	Nov 25 07:07 2014	24 Nov 2014 17:30
3	0.20	Nov 25 09:21 2014	Nov 25 09:20 2014	25 Nov 2014 7:56
4	0.40	Nov 25 09:22 2014	Nov 25 09:21 2014	25 Nov 2014 8:30
5	1.0	Nov 25 07:17 2014	Nov 25 07:07 2014	24 Nov 2014 19:13
6	5.0	Nov 25 07:17 2014	Nov 25 07:07 2014	24 Nov 2014 19:47
7	25	Nov 25 07:18 2014	Nov 25 07:07 2014	24 Nov 2014 20:21
8	50	Nov 25 07:18 2014	Nov 25 07:07 2014	24 Nov 2014 20:55
9	100	Nov 25 07:18 2014	Nov 25 07:16 2014	24 Nov 2014 21:29

R16112414.M Tue Nov 25 09:33:52 2014

11/25/14

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241413.D
Acq On : 24 Nov 2014 16:56 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-11141401/S29-10281402 (11/26)
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Nov 25 07:07:37 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 11/25/14

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	169111	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.33	114	815974	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	280259	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.06	65	187801	12.252	ng		-0.01
Spiked Amount 12.500			Recovery =	98.00%			
57) Toluene-d8 (SS2)	15.78	98	697729	13.441	ng		0.00
Spiked Amount 12.500			Recovery =	107.52%			
73) Bromofluorobenzene (SS3)	19.04	174	331107	12.842	ng		0.00
Spiked Amount 12.500			Recovery =	102.72%			
Target Compounds							Qvalue
2) Propene	4.16	42	1160	0.073	ng	#	85
3) Dichlorodifluoromethan...	4.31	85	2285	0.074	ng	#	90
4) Chloromethane	4.61	50	1726	0.085	ng	#	41
5) 1,2-Dichloro-1,1,2,2-t...	4.85	135	1421	0.079	ng	#	42
6) Vinyl Chloride	5.03	62	1546	0.072	ng	#	42
7) 1,3-Butadiene	5.29	54	836	0.060	ng		87
8) Bromomethane	5.73	94	1178	0.075	ng		94
9) Chloroethane	6.06	64	860	0.072	ng	#	43
10) Ethanol	6.37	45	6985	0.662	ng		95
11) Acetonitrile	6.68	41	3415	0.128	ng	#	39
12) Acrolein	6.86	56	1022	0.108	ng	#	16
13) Acetone	7.06	58	15340	1.194	ng		91
14) Trichlorofluoromethane	7.30	101	1919	0.085	ng		98
15) 2-Propanol (Isopropanol)	7.56	45	6877	0.197	ng		97
16) Acrylonitrile	7.83	53	1534	0.080	ng		98
17) 1,1-Dichloroethene	8.27	96	1232	0.076	ng		85
18) 2-Methyl-2-Propanol (t...	8.46	59	7525	0.220	ng	#	82
19) Methylene Chloride	8.48	84	2597	0.153	ng		95
20) 3-Chloro-1-propene (Al...	8.65	41	1056	0.063	ng	#	29
21) Trichlorotrifluoroethane	8.90	151	1294	0.094	ng		98
22) Carbon Disulfide	8.76	76	7621	0.125	ng	#	75
23) trans-1,2-Dichloroethene	9.76	61	1407	0.070	ng		93
24) 1,1-Dichloroethane	10.00	63	1999	0.077	ng		89
25) Methyl tert-Butyl Ether	10.15	73	3401	0.083	ng		95
26) Vinyl Acetate	10.27	86	1422	0.416	ng	#	50
27) 2-Butanone (MEK)	10.54	72	1520	0.144	ng	#	49
28) cis-1,2-Dichloroethene	11.03	61	1416	0.074	ng		96
29) Diisopropyl Ether	11.35	87	1244	0.088	ng	#	32
30) Ethyl Acetate	11.36	61	1139	0.224	ng		86
31) n-Hexane	11.32	57	2085	0.095	ng	#	85
32) Chloroform	11.36	83	2180	0.089	ng		97
34) Tetrahydrofuran (THF)	11.82	72	1006	0.101	ng	#	85
35) Ethyl tert-Butyl Ether	11.95	87	1323	0.077	ng	#	87
36) 1,2-Dichloroethane	12.18	62	1261	0.084	ng	#	42
38) 1,1,1-Trichloroethane	12.45	97	1755	0.078	ng	#	75
39) Isopropyl Acetate	12.91	61	1740	0.189	ng	#	74
40) 1-Butanol	12.94	56	4449	0.307	ng		98
41) Benzene	12.94	78	6125	0.087	ng		97
42) Carbon Tetrachloride	13.10	117	1478	0.079	ng		92
43) Cyclohexane	13.23	84	4022	0.165	ng		98
44) tert-Amyl Methyl Ether	13.59	73	3487	0.080	ng		96
45) 1,2-Dichloropropane	13.79	63	1191	0.078	ng		94

Data File: I:\MS16\DATA\2014_11\24\11241413.D
Acq On : 24 Nov 2014 16:56 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-11141401/S29-10281402 (11/26)
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Nov 25 07:07:37 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

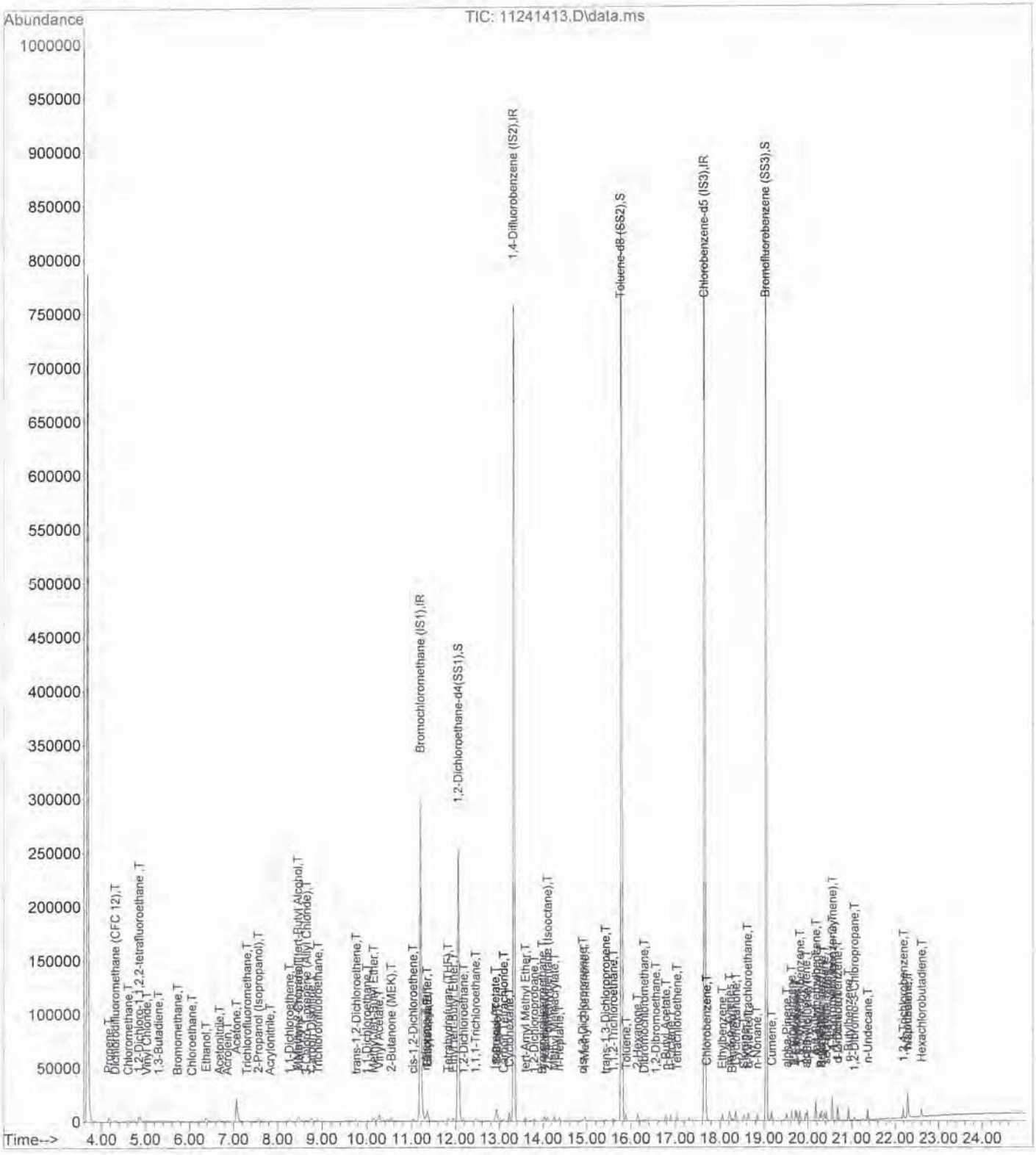
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
46) Bromodichloromethane	13.99	83	1658	0.083	ng		95
47) Trichloroethene	14.04	130	1512	0.080	ng		90
48) 1,4-Dioxane	14.03	88	1569	0.110	ng		95
49) 2,2,4-Trimethylpentane...	14.11	57	5319	0.084	ng		95
50) Methyl Methacrylate	14.26	100	1038	0.163	ng	#	80
51) n-Heptane	14.38	71	1167	0.084	ng	#	84
52) cis-1,3-Dichloropropene	14.91	75	1570	0.069	ng	#	43
53) 4-Methyl-2-pentanone	14.95	58	1249	0.089	ng	#	53
54) trans-1,3-Dichloropropene	15.43	75	1240	0.062	ng	#	43
55) 1,1,2-Trichloroethane	15.60	97	1290	0.076	ng		99
58) Toluene	15.89	91	6287	0.099	ng		99
59) 2-Hexanone	16.15	43	5876	0.203	ng		91
60) Dibromochloromethane	16.29	129	1522	0.093	ng		95
61) 1,2-Dibromoethane	16.56	107	1361	0.084	ng		98
62) n-Butyl Acetate	16.78	43	4712	0.164	ng		93
63) n-Octane	16.89	57	880	0.084	ng		95
64) Tetrachloroethene	17.03	166	2005	0.100	ng		95
65) Chlorobenzene	17.70	112	4212	0.103	ng		98
66) Ethylbenzene	18.05	91	6011	0.095	ng		97
67) m- & p-Xylenes	18.22	91	9214	0.184	ng		100
68) Bromoform	18.27	173	1455	0.101	ng		85
69) Styrene	18.54	104	3868	0.098	ng		95
70) o-Xylene	18.65	91	4704	0.092	ng		97
71) n-Nonane	18.84	43	1986	0.084	ng		98
72) 1,1,2,2-Tetrachloroethane	18.63	83	2511	0.095	ng		96
74) Cumene	19.17	105	6915	0.101	ng		98
75) alpha-Pinene	19.52	93	2849	0.089	ng	#	4
76) n-Propylbenzene	19.62	91	8113	0.098	ng		96
77) 3-Ethyltoluene	19.71	105	7577	0.117	ng		93
78) 4-Ethyltoluene	19.75	105	6381	0.100	ng		98
79) 1,3,5-Trimethylbenzene	19.81	105	5874	0.110	ng		95
80) alpha-Methylstyrene	19.95	118	2822	0.097	ng		91
81) 2-Ethyltoluene	19.98	105	6662	0.105	ng		97
82) 1,2,4-Trimethylbenzene	20.18	105	5894	0.111	ng		98
83) n-Decane	20.27	57	2723	0.101	ng		90
84) Benzyl Chloride	20.30	91	3875	0.091	ng		92
85) 1,3-Dichlorobenzene	20.31	146	4225	0.120	ng		99
86) 1,4-Dichlorobenzene	20.37	146	4687	0.124	ng		98
87) sec-Butylbenzene	20.41	105	7891	0.109	ng		98
88) 4-Isopropyltoluene (p-...	20.55	119	8332	0.125	ng		99
89) 1,2,3-Trimethylbenzene	20.55	105	6548	0.117	ng		100
90) 1,2-Dichlorobenzene	20.68	146	4089	0.120	ng		96
91) d-Limonene	20.68	68	1581	0.084	ng		90
92) 1,2-Dibromo-3-Chloropr...	21.06	157	1206	0.101	ng	#	74
93) n-Undecane	21.37	57	3297	0.116	ng		95
94) 1,2,4-Trichlorobenzene	22.18	180	4520	0.170	ng		98
95) Naphthalene	22.29	128	17052	0.219	ng		97
96) n-Dodecane	22.28	57	4096	0.165	ng		93
97) Hexachlorobutadiene	22.60	225	2044	0.124	ng		100
98) Cyclohexanone	18.36	55	4677	0.244	ng		99
99) tert-Butylbenzene	20.18	119	5843	0.110	ng		98
100) n-Butylbenzene	20.92	91	7161	0.129	ng		94

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241413.D
Acq On : 24 Nov 2014 16:56 Operator: LH
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-11141401/S29-10281402 (11/26)
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Nov 25 07:07:37 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241414.D
Acq On : 24 Nov 2014 17:30 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-11141401/S29-10281402 (11/26)
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Nov 25 07:07:39 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 11/25/14

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	164631	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.33	114	782983	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	277871	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.06	65	176364	11.819	ng		-0.01
Spiked Amount 12.500			Recovery = 94.56%				
57) Toluene-d8 (SS2)	15.78	98	671721	13.051	ng		0.00
Spiked Amount 12.500			Recovery = 104.40%				
73) Bromofluorobenzene (SS3)	19.04	174	326940	12.789	ng		0.00
Spiked Amount 12.500			Recovery = 102.32%				
Target Compounds							Qvalue
2) Propene	4.16	42	1382	0.089	ng		90
3) Dichlorodifluoromethan...	4.31	85	2931	0.097	ng	#	90
4) Chloromethane	4.61	50	2057	0.104	ng		89
5) 1,2-Dichloro-1,1,2,2-t...	4.85	135	1879	0.107	ng		92
6) Vinyl Chloride	5.02	62	1900	0.091	ng		95
7) 1,3-Butadiene	5.28	54	1023	0.075	ng		90
8) Bromomethane	5.72	94	1461	0.095	ng		98
9) Chloroethane	6.04	64	1093	0.093	ng	#	43
10) Ethanol	6.37	45	5547	0.540	ng		99
11) Acetonitrile	6.67	41	2383	0.092	ng	#	1
12) Acrolein	6.86	56	888	0.097	ng		95
13) Acetone	7.06	58	14928	1.193	ng		91
14) Trichlorofluoromethane	7.31	101	2412	0.109	ng		99
15) 2-Propanol (Isopropanol)	7.55	45	7843	0.231	ng		98
16) Acrylonitrile	7.84	53	1371	0.074	ng		95
17) 1,1-Dichloroethene	8.26	96	1601	0.101	ng		97
18) 2-Methyl-2-Propanol (t...	8.45	59	8733	0.263	ng	#	83
19) Methylene Chloride	8.47	84	2770	0.167	ng		93
20) 3-Chloro-1-propene (Al...	8.65	41	1365	0.083	ng	#	29
21) Trichlorotrifluoroethane	8.91	151	1512	0.113	ng		94
22) Carbon Disulfide	8.77	76	9081	0.153	ng		91
23) trans-1,2-Dichloroethene	9.76	61	1870	0.096	ng		98
24) 1,1-Dichloroethane	10.00	63	2486	0.098	ng		86
25) Methyl tert-Butyl Ether	10.15	73	3922	0.098	ng		94
26) Vinyl Acetate	10.27	86	1620	0.486	ng	#	45
27) 2-Butanone (MEK)	10.55	72	1623	0.158	ng	#	74
28) cis-1,2-Dichloroethene	11.03	61	1904	0.102	ng		98
29) Diisopropyl Ether	11.35	87	1495	0.109	ng	#	78
30) Ethyl Acetate	11.36	61	864	0.174	ng		87
31) n-Hexane	11.32	57	2457	0.115	ng	#	88
32) Chloroform	11.37	83	2623	0.110	ng		90
34) Tetrahydrofuran (THF)	11.82	72	1222	0.126	ng		96
35) Ethyl tert-Butyl Ether	11.94	87	1653	0.099	ng	#	86
36) 1,2-Dichloroethane	12.18	62	1411	0.097	ng	#	42
38) 1,1,1-Trichloroethane	12.45	97	2116	0.098	ng		99
39) Isopropyl Acetate	12.91	61	1993	0.226	ng	#	84
40) 1-Butanol	12.94	56	3924	0.282	ng		100
41) Benzene	12.94	78	7318	0.108	ng		99
42) Carbon Tetrachloride	13.09	117	1880	0.105	ng		98
43) Cyclohexane	13.23	84	5000	0.214	ng		97
44) tert-Amyl Methyl Ether	13.59	73	4226	0.101	ng		95
45) 1,2-Dichloropropane	13.80	63	1548	0.105	ng		95

Data File: I:\MS16\DATA\2014_11\24\11241414.D
Acq On : 24 Nov 2014 17:30 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-11141401/S29-10281402 (11/26)
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Nov 25 07:07:39 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

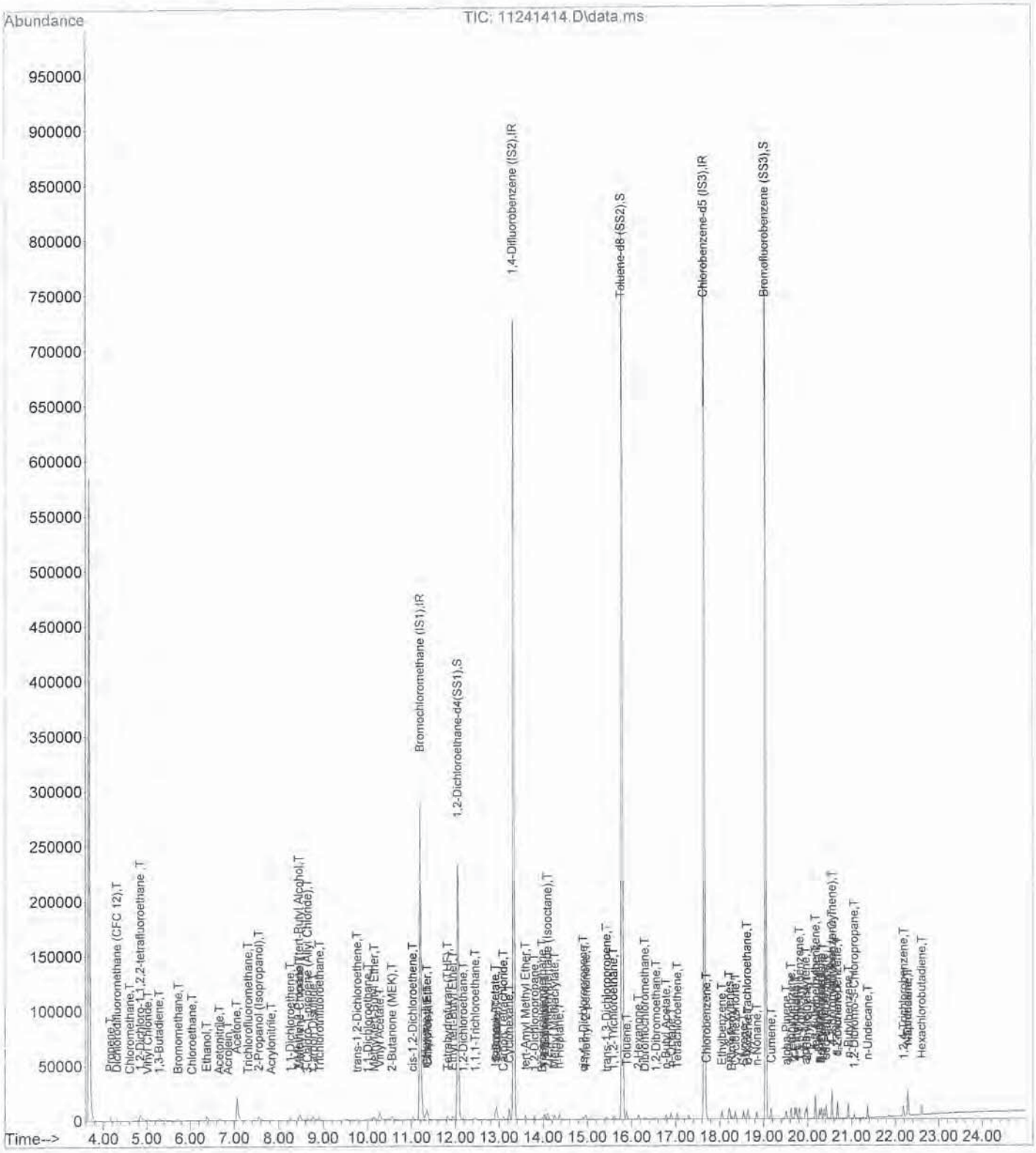
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
46) Bromodichloromethane	13.98	83	1881	0.099	ng		98
47) Trichloroethene	14.03	130	1874	0.104	ng		95
48) 1,4-Dioxane	14.03	88	1751	0.128	ng		85
49) 2,2,4-Trimethylpentane...	14.10	57	6243	0.103	ng		98
50) Methyl Methacrylate	14.25	100	1166	0.191	ng		98
51) n-Heptane	14.36	71	1556	0.117	ng	#	79
52) cis-1,3-Dichloropropene	14.91	75	1944	0.088	ng	#	43
53) 4-Methyl-2-pentanone	14.96	58	1532	0.114	ng	#	81
54) trans-1,3-Dichloropropene	15.43	75	1486	0.078	ng	#	43
55) 1,1,2-Trichloroethane	15.59	97	1612	0.099	ng		99
58) Toluene	15.89	91	7495	0.119	ng		97
59) 2-Hexanone	16.15	43	4245	0.148	ng		90
60) Dibromochloromethane	16.29	129	1847	0.114	ng		94
61) 1,2-Dibromoethane	16.55	107	1760	0.109	ng		98
62) n-Butyl Acetate	16.78	43	3642	0.128	ng		98
63) n-Octane	16.89	57	1144	0.110	ng		97
64) Tetrachloroethene	17.04	166	2341	0.117	ng		95
65) Chlorobenzene	17.70	112	5252	0.130	ng		97
66) Ethylbenzene	18.05	91	7073	0.112	ng		97
67) m- & p-Xylenes	18.22	91	10906	0.219	ng		99
68) Bromoform	18.27	173	1660	0.116	ng		88
69) Styrene	18.54	104	4910	0.126	ng		96
70) o-Xylene	18.64	91	5678	0.112	ng		97
71) n-Nonane	18.84	43	2472	0.106	ng		91
72) 1,1,2,2-Tetrachloroethane	18.62	83	2844	0.109	ng		96
74) Cumene	19.17	105	8022	0.118	ng		99
75) alpha-Pinene	19.52	93	3287	0.103	ng	#	15
76) n-Propylbenzene	19.62	91	9420	0.115	ng		99
77) 3-Ethyltoluene	19.71	105	8518	0.133	ng		90
78) 4-Ethyltoluene	19.75	105	7362	0.116	ng		86
79) 1,3,5-Trimethylbenzene	19.81	105	6701	0.127	ng		98
80) alpha-Methylstyrene	19.95	118	3454	0.119	ng		98
81) 2-Ethyltoluene	19.98	105	8026	0.128	ng		98
82) 1,2,4-Trimethylbenzene	20.18	105	6802	0.129	ng		98
83) n-Decane	20.27	57	2951	0.110	ng		96
84) Benzyl Chloride	20.30	91	4244	0.101	ng		96
85) 1,3-Dichlorobenzene	20.31	146	4852	0.139	ng		99
86) 1,4-Dichlorobenzene	20.37	146	5153	0.137	ng		98
87) sec-Butylbenzene	20.41	105	9582	0.134	ng		99
88) 4-Isopropyltoluene (p-...	20.55	119	9665	0.146	ng		95
89) 1,2,3-Trimethylbenzene	20.55	105	7766	0.140	ng		100
90) 1,2-Dichlorobenzene	20.67	146	4832	0.142	ng		98
91) d-Limonene	20.68	68	1990	0.107	ng		87
92) 1,2-Dibromo-3-Chloropr...	21.06	157	1307	0.110	ng	#	78
93) n-Undecane	21.37	57	3457	0.123	ng		96
94) 1,2,4-Trichlorobenzene	22.18	180	4848	0.183	ng		98
95) Naphthalene	22.29	128	17261	0.224	ng		98
96) n-Dodecane	22.28	57	4207	0.171	ng		97
97) Hexachlorobutadiene	22.60	225	2476	0.152	ng		100
98) Cyclohexanone	18.36	55	3659	0.192	ng		96
99) tert-Butylbenzene	20.18	119	6999	0.133	ng		98
100) n-Butylbenzene	20.93	91	8265	0.150	ng		94

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241414.D
Acq On : 24 Nov 2014 17:30 Operator: LH
Sample : 0.1ng TO-15 ICAL STD
Misc : S29-11141401/S29-10281402 (11/26)
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Nov 25 07:07:39 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241431.D
Acq On : 25 Nov 2014 7:56 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201408 (12/19)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Nov 25 09:20:31 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:18:18 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 11/25/14

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.19	130	170535	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.33	114	783151	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.65	82	280948	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.05	65	181775	12.293	ng		-0.03
Spiked Amount 12.500			Recovery = 98.32%				
57) Toluene-d8 (SS2)	15.78	98	707904	12.964	ng		-0.01
Spiked Amount 12.500			Recovery = 103.68%				
73) Bromofluorobenzene (SS3)	19.04	174	330908	12.238	ng		0.00
Spiked Amount 12.500			Recovery = 97.92%				
Target Compounds							Qvalue
2) Propene	4.15	42	4366	0.305	ng		98
3) Dichlorodifluoromethan...	4.30	85	7288	0.228	ng	#	96
4) Chloromethane	4.59	50	5510	0.262	ng		97
5) 1,2-Dichloro-1,1,2,2-t...	4.84	135	5083	0.257	ng		97
6) Vinyl Chloride	5.01	62	5290	0.237	ng		93
7) 1,3-Butadiene	5.27	54	3400	0.258	ng		97
8) Bromomethane	5.71	94	3963	0.241	ng		96
9) Chloroethane	6.04	64	2796	0.229	ng		95
10) Ethanol	6.35	45	20324	1.812	ng		96
11) Acetonitrile	6.64	41	10759	0.393	ng	#	66
12) Acrolein	6.84	56	2484	0.261	ng		93
13) Acetone	7.05	58	20158	1.263	ng		99
14) Trichlorofluoromethane	7.29	101	6249	0.265	ng		96
15) 2-Propanol (Isopropanol)	7.53	45	17249	0.477	ng		97
16) Acrylonitrile	7.80	53	5559	0.292	ng		100
17) 1,1-Dichloroethene	8.26	96	4009	0.242	ng		99
18) 2-Methyl-2-Propanol (t...	8.43	59	16906	0.452	ng		95
19) Methylene Chloride	8.46	84	5480	0.272	ng		94
20) 3-Chloro-1-propene (Al...	8.63	41	3894	0.246	ng		94
21) Trichlorotrifluoroethane	8.89	151	4489	0.305	ng		97
22) Carbon Disulfide	8.75	76	15333	0.223	ng		95
23) trans-1,2-Dichloroethene	9.75	61	4725	0.240	ng		96
24) 1,1-Dichloroethane	9.99	63	6438	0.253	ng		98
25) Methyl tert-Butyl Ether	10.13	73	10531	0.253	ng		98
26) Vinyl Acetate	10.26	86	4385	1.122	ng	#	71
27) 2-Butanone (MEK)	10.53	72	3156	0.259	ng	#	79
28) cis-1,2-Dichloroethene	11.02	61	4843	0.258	ng		99
29) Diisopropyl Ether	11.34	87	3753	0.253	ng	#	57
30) Ethyl Acetate	11.34	61	3065	0.587	ng		99
31) n-Hexane	11.31	57	5755	0.270	ng		99
32) Chloroform	11.36	83	6439	0.252	ng		100
34) Tetrahydrofuran (THF)	11.80	72	3308	0.311	ng		94
35) Ethyl tert-Butyl Ether	11.93	87	4584	0.257	ng		97
36) 1,2-Dichloroethane	12.17	62	3859	0.251	ng		94
38) 1,1,1-Trichloroethane	12.45	97	5395	0.247	ng		97
39) Isopropyl Acetate	12.90	61	4906	0.555	ng	#	92
40) 1-Butanol	12.93	56	9386	0.566	ng		98
41) Benzene	12.94	78	17311	0.283	ng		99
42) Carbon Tetrachloride	13.09	117	5054	0.280	ng		99
43) Cyclohexane	13.23	84	12025	0.511	ng		98
44) tert-Amyl Methyl Ether	13.59	73	10541	0.253	ng		97
45) 1,2-Dichloropropane	13.79	63	3776	0.260	ng		100

Data File: I:\MS16\DATA\2014_11\24\11241431.D
Acq On : 25 Nov 2014 7:56 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201408 (12/19)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Nov 25 09:20:31 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:18:18 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

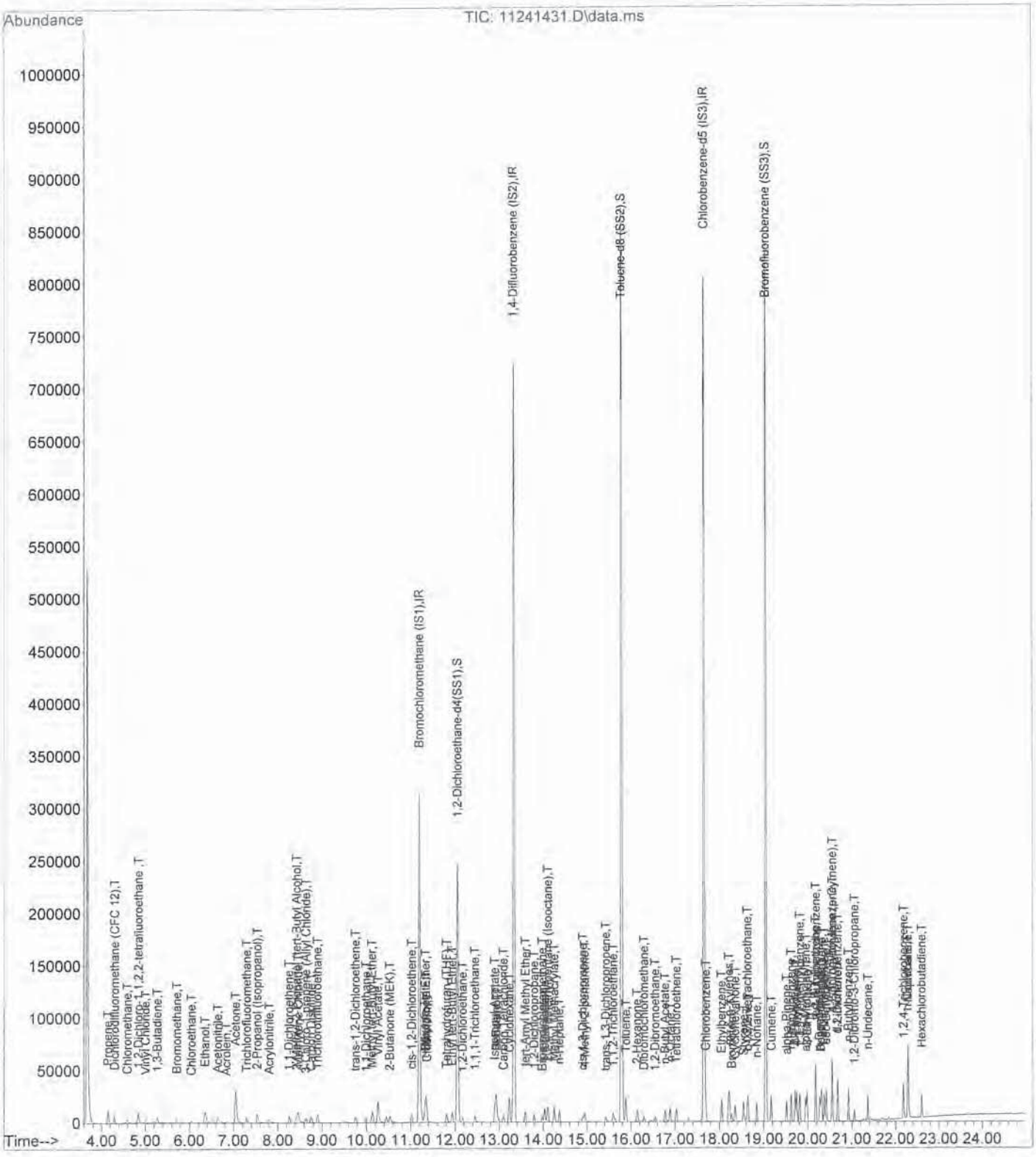
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
46) Bromodichloromethane	13.98	83	4763	0.246	ng	99
47) Trichloroethene	14.03	130	4808	0.251	ng	98
48) 1,4-Dioxane	14.04	88	3661	0.241	ng	98
49) 2,2,4-Trimethylpentane...	14.10	57	15251	0.253	ng	99
50) Methyl Methacrylate	14.25	100	3418	0.526	ng	97
51) n-Heptane	14.36	71	3464	0.249	ng	99
52) cis-1,3-Dichloropropene	14.90	75	5308	0.238	ng	96
53) 4-Methyl-2-pentanone	14.95	58	3303	0.232	ng	90
54) trans-1,3-Dichloropropene	15.43	75	4521	0.239	ng	98
55) 1,1,2-Trichloroethane	15.60	97	4275	0.265	ng	97
58) Toluene	15.89	91	22586	0.338	ng	98
59) 2-Hexanone	16.14	43	10884	0.320	ng	93
60) Dibromochloromethane	16.30	129	4711	0.243	ng	100
61) 1,2-Dibromoethane	16.55	107	4834	0.260	ng	99
62) n-Butyl Acetate	16.77	43	10629	0.310	ng	99
63) n-Octane	16.89	57	2887	0.254	ng	96
64) Tetrachloroethene	17.03	166	5781	0.238	ng	99
65) Chlorobenzene	17.69	112	12737	0.272	ng	99
66) Ethylbenzene	18.05	91	18991	0.268	ng	100
67) m- & p-Xylenes	18.21	91	30800	0.550	ng	98
68) Bromoform	18.28	173	4215	0.235	ng	97
69) Styrene	18.54	104	12313	0.257	ng	99
70) o-Xylene	18.64	91	14925	0.256	ng	97
71) n-Nonane	18.84	43	6086	0.244	ng	95
72) 1,1,2,2-Tetrachloroethane	18.63	83	7348	0.238	ng	100
74) Cumene	19.17	105	19432	0.241	ng	98
75) alpha-Pinene	19.52	93	8927	0.244	ng	82
76) n-Propylbenzene	19.62	91	23535	0.244	ng	99
77) 3-Ethyltoluene	19.71	105	19853	0.246	ng	97
78) 4-Ethyltoluene	19.75	105	20275	0.269	ng	95
79) 1,3,5-Trimethylbenzene	19.81	105	16273	0.251	ng	97
80) alpha-Methylstyrene	19.95	118	8764	0.246	ng	98
81) 2-Ethyltoluene	19.98	105	18918	0.246	ng	100
82) 1,2,4-Trimethylbenzene	20.18	105	16771	0.259	ng	99
83) n-Decane	20.27	57	8445	0.277	ng	99
84) Benzyl Chloride	20.29	91	13762	0.288	ng	98
85) 1,3-Dichlorobenzene	20.31	146	13612	0.310	ng	99
86) 1,4-Dichlorobenzene	20.37	146	14038	0.293	ng	98
87) sec-Butylbenzene	20.41	105	21910	0.248	ng	99
88) 4-Isopropyltoluene (p-...	20.55	119	21146	0.247	ng	99
89) 1,2,3-Trimethylbenzene	20.55	105	17630	0.252	ng	100
90) 1,2-Dichlorobenzene	20.67	146	12484	0.290	ng	99
91) d-Limonene	20.68	68	5075	0.243	ng	97
92) 1,2-Dibromo-3-Chloropr...	21.06	157	4066	0.267	ng	90
93) n-Undecane	21.37	57	7705	0.225	ng	98
94) 1,2,4-Trichlorobenzene	22.18	180	13621	0.350	ng	99
95) Naphthalene	22.29	128	55540	0.494	ng	98
96) n-Dodecane	22.28	57	8297	0.253	ng	94
97) Hexachlorobutadiene	22.60	225	5455	0.249	ng	99
98) Cyclohexanone	18.35	55	8582	0.360	ng	97
99) tert-Butylbenzene	20.17	119	16312	0.251	ng	99
100) n-Butylbenzene	20.92	91	18095	0.253	ng	97

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241431.D
Acq On : 25 Nov 2014 7:56 Operator: LH
Sample : 0.2ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201408 (12/19)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Nov 25 09:20:31 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:18:18 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241432.D
Acq On : 25 Nov 2014 8:30 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201408 (12/19)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Nov 25 09:21:23 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:18:18 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

m 11/25/14

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	166514	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.33	114	763722	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.65	82	279213	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.05	65	184539	12.781	ng		-0.03
Spiked Amount 12.500			Recovery = 102.24%				
57) Toluene-d8 (SS2)	15.78	98	699694	12.893	ng		-0.01
Spiked Amount 12.500			Recovery = 103.12%				
73) Bromofluorobenzene (SS3)	19.04	174	326969	12.167	ng		0.00
Spiked Amount 12.500			Recovery = 97.36%				
Target Compounds							Qvalue
2) Propene	4.14	42	6247	0.447	ng		98
3) Dichlorodifluoromethan...	4.29	85	13437	0.430	ng		97
4) Chloromethane	4.58	50	9223	0.449	ng		97
5) 1,2-Dichloro-1,1,2,2-t...	4.84	135	8275	0.429	ng		98
6) Vinyl Chloride	5.00	62	9328	0.428	ng		98
7) 1,3-Butadiene	5.26	54	5697	0.442	ng		97
8) Bromomethane	5.70	94	7145	0.444	ng		98
9) Chloroethane	6.04	64	5022	0.422	ng		95
10) Ethanol	6.35	45	23801m	2.173	ng		
11) Acetonitrile	6.64	41	11596	0.434	ng		73
12) Acrolein	6.84	56	3465	0.373	ng		99
13) Acetone	7.05	58	27522	1.765	ng		97
14) Trichlorofluoromethane	7.29	101	10764	0.467	ng		98
15) 2-Propanol (Isopropanol)	7.52	45	29489	0.835	ng		98
16) Acrylonitrile	7.79	53	8338	0.448	ng		97
17) 1,1-Dichloroethene	8.26	96	7261	0.449	ng		99
18) 2-Methyl-2-Propanol (t...	8.41	59	30081	0.824	ng		98
19) Methylene Chloride	8.47	84	8716	0.443	ng		100
20) 3-Chloro-1-propene (Al...	8.63	41	6657	0.431	ng		94
21) Trichlorotrifluoroethane	8.90	151	6613	0.459	ng		98
22) Carbon Disulfide	8.76	76	25502	0.379	ng		96
23) trans-1,2-Dichloroethene	9.75	61	8387	0.436	ng		97
24) 1,1-Dichloroethane	9.99	63	11067	0.445	ng		100
25) Methyl tert-Butyl Ether	10.13	73	18133	0.446	ng		99
26) Vinyl Acetate	10.26	86	8019	2.100	ng	#	81
27) 2-Butanone (MEK)	10.53	72	4454	0.375	ng	#	78
28) cis-1,2-Dichloroethene	11.02	61	8477	0.462	ng		100
29) Diisopropyl Ether	11.33	87	6663	0.460	ng	#	82
30) Ethyl Acetate	11.35	61	4719	0.925	ng		99
31) n-Hexane	11.32	57	9672	0.464	ng		96
32) Chloroform	11.36	83	12006	0.481	ng		100
34) Tetrahydrofuran (THF)	11.81	72	4534	0.436	ng		94
35) Ethyl tert-Butyl Ether	11.93	87	7751	0.446	ng		98
36) 1,2-Dichloroethane	12.18	62	6911	0.459	ng		99
38) 1,1,1-Trichloroethane	12.46	97	9204	0.432	ng		99
39) Isopropyl Acetate	12.90	61	8382	0.973	ng		96
40) 1-Butanol	12.92	56	11645	0.719	ng		91
41) Benzene	12.94	78	29726	0.499	ng		99
42) Carbon Tetrachloride	13.09	117	8570	0.487	ng		95
43) Cyclohexane	13.23	84	20442	0.891	ng		95
44) tert-Amyl Methyl Ether	13.58	73	19484	0.480	ng		98
45) 1,2-Dichloropropane	13.79	63	6557	0.463	ng		96

Data File: I:\MS16\DATA\2014_11\24\11241432.D
Acq On : 25 Nov 2014 8:30 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201408 (12/19)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Nov 25 09:21:23 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:18:18 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

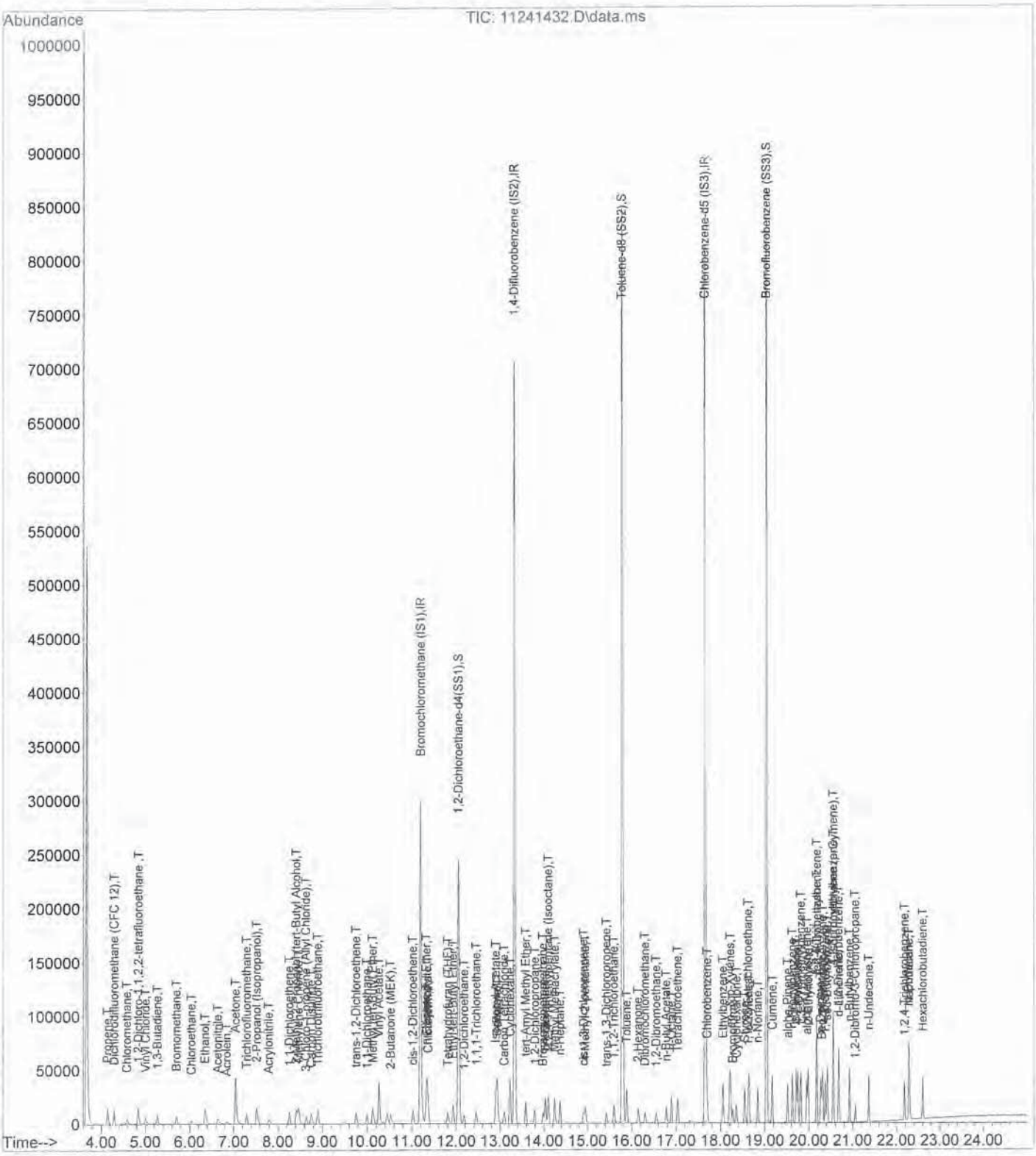
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
46) Bromodichloromethane	13.98	83	8779	0.464	ng	99
47) Trichloroethene	14.03	130	8556	0.459	ng	100
48) 1,4-Dioxane	14.03	88	6193	0.418	ng	97
49) 2,2,4-Trimethylpentane...	14.10	57	27054	0.459	ng	98
50) Methyl Methacrylate	14.25	100	5625	0.887	ng	92
51) n-Heptane	14.37	71	6357	0.468	ng	97
52) cis-1,3-Dichloropropene	14.91	75	10013	0.461	ng	98
53) 4-Methyl-2-pentanone	14.95	58	5595	0.404	ng	91
54) trans-1,3-Dichloropropene	15.43	75	7931	0.430	ng	99
55) 1,1,2-Trichloroethane	15.60	97	7643	0.486	ng	98
58) Toluene	15.88	91	32129	0.485	ng	100
59) 2-Hexanone	16.14	43	12230	0.362	ng	100
60) Dibromochloromethane	16.30	129	8330	0.433	ng	98
61) 1,2-Dibromoethane	16.55	107	8403	0.456	ng	99
62) n-Butyl Acetate	16.77	43	13546	0.397	ng	99
63) n-Octane	16.89	57	5276	0.466	ng	97
64) Tetrachloroethene	17.03	166	10497	0.435	ng	99
65) Chlorobenzene	17.69	112	21477	0.461	ng	98
66) Ethylbenzene	18.05	91	32491	0.462	ng	98
67) m- & p-Xylenes	18.22	91	51525	0.926	ng	99
68) Bromoform	18.28	173	7908	0.444	ng	98
69) Styrene	18.54	104	20134	0.423	ng	99
70) o-Xylene	18.64	91	25840	0.446	ng	99
71) n-Nonane	18.84	43	10944	0.442	ng	99
72) 1,1,2,2-Tetrachloroethane	18.62	83	13105	0.428	ng	99
74) Cumene	19.17	105	33577	0.419	ng	100
75) alpha-Pinene	19.52	93	15743	0.434	ng	90
76) n-Propylbenzene	19.62	91	39880	0.416	ng	99
77) 3-Ethyltoluene	19.71	105	33690	0.420	ng	94
78) 4-Ethyltoluene	19.75	105	34438	0.460	ng	95
79) 1,3,5-Trimethylbenzene	19.81	105	28340	0.439	ng	99
80) alpha-Methylstyrene	19.95	118	14657	0.414	ng	98
81) 2-Ethyltoluene	19.98	105	33461	0.439	ng	98
82) 1,2,4-Trimethylbenzene	20.18	105	28542	0.444	ng	99
83) n-Decane	20.27	57	13390	0.442	ng	98
84) Benzyl Chloride	20.29	91	21357	0.449	ng	97
85) 1,3-Dichlorobenzene	20.31	146	20325	0.466	ng	100
86) 1,4-Dichlorobenzene	20.37	146	20209	0.425	ng	100
87) sec-Butylbenzene	20.41	105	39069	0.444	ng	100
88) 4-Isopropyltoluene (p-...	20.55	119	36240	0.425	ng	98
89) 1,2,3-Trimethylbenzene	20.55	105	29070	0.418	ng	98
90) 1,2-Dichlorobenzene	20.67	146	19162	0.447	ng	100
91) d-Limonene	20.68	68	9313	0.449	ng	96
92) 1,2-Dibromo-3-Chloropr...	21.05	157	6141	0.406	ng	92
93) n-Undecane	21.37	57	12894	0.378	ng	99
94) 1,2,4-Trichlorobenzene	22.18	180	15013	0.388	ng	99
95) Naphthalene	22.29	128	44672	0.400	ng	98
96) n-Dodecane	22.28	57	12517	0.383	ng	96
97) Hexachlorobutadiene	22.60	225	9115	0.419	ng	99
98) Cyclohexanone	18.36	55	9271	0.391	ng	99
99) tert-Butylbenzene	20.18	119	28526	0.441	ng	100
100) n-Butylbenzene	20.92	91	29920	0.421	ng	97

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241432.D
Acq On : 25 Nov 2014 8:30 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201408 (12/19)
ALS Vial : 9 Sample Multiplier: 1

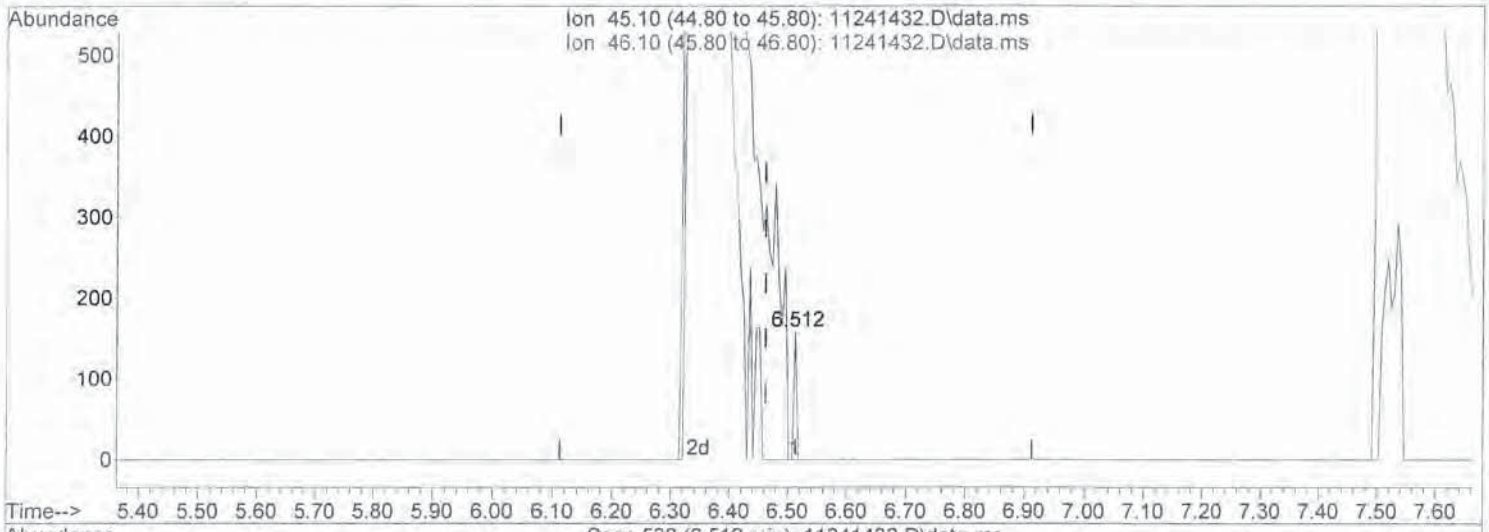
Quant Time: Nov 25 09:21:23 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:18:18 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

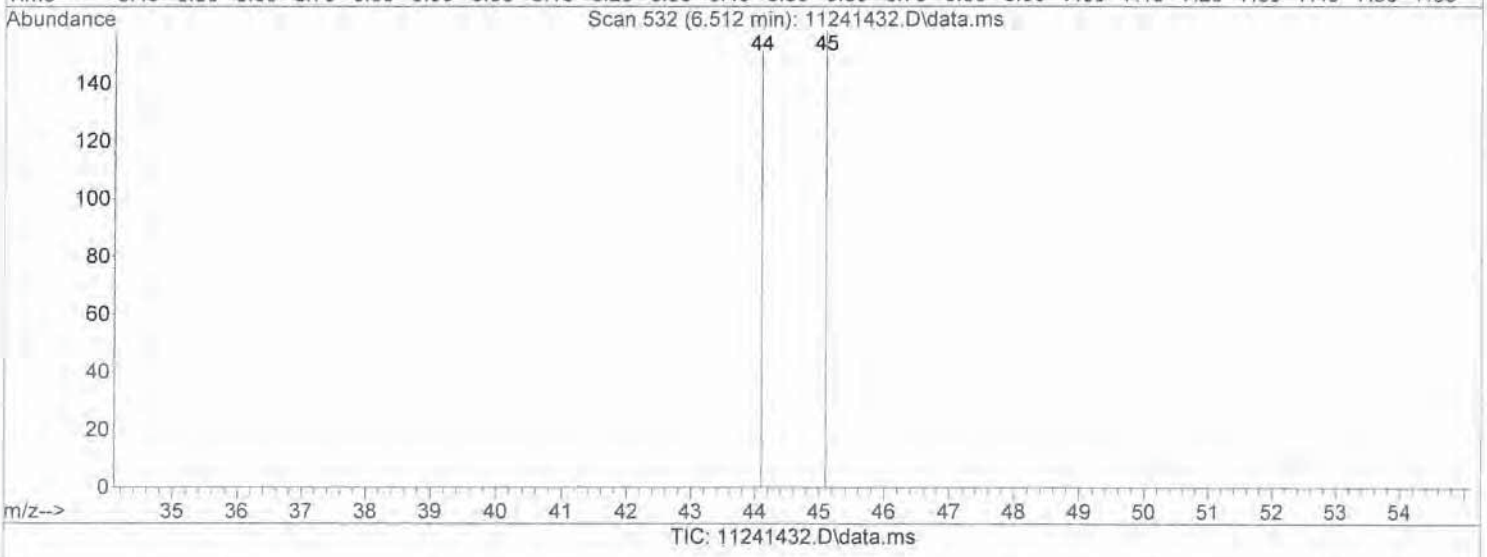


Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2014_11\24\11241432.D
Acq On : 25 Nov 2014 8:30 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201408 (12/19)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Nov 25 09:21:09 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:18:18 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 11241432.D\data.ms

(10) Ethanol (T)

6.512min (+0.050) 0.00ng

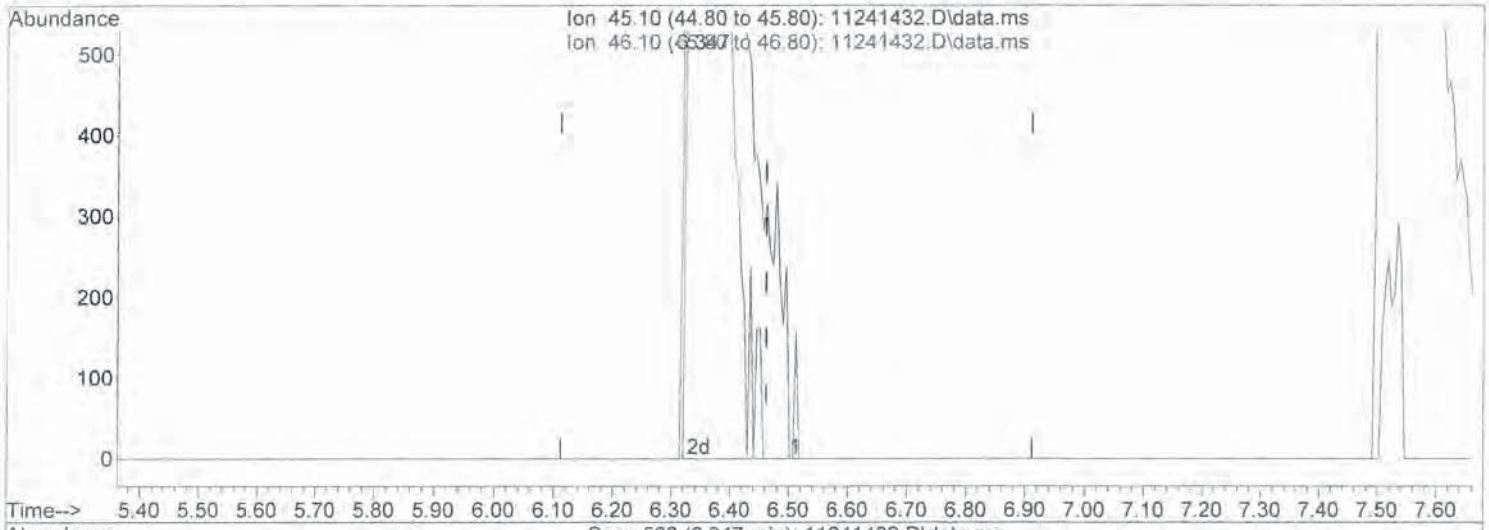
response 52

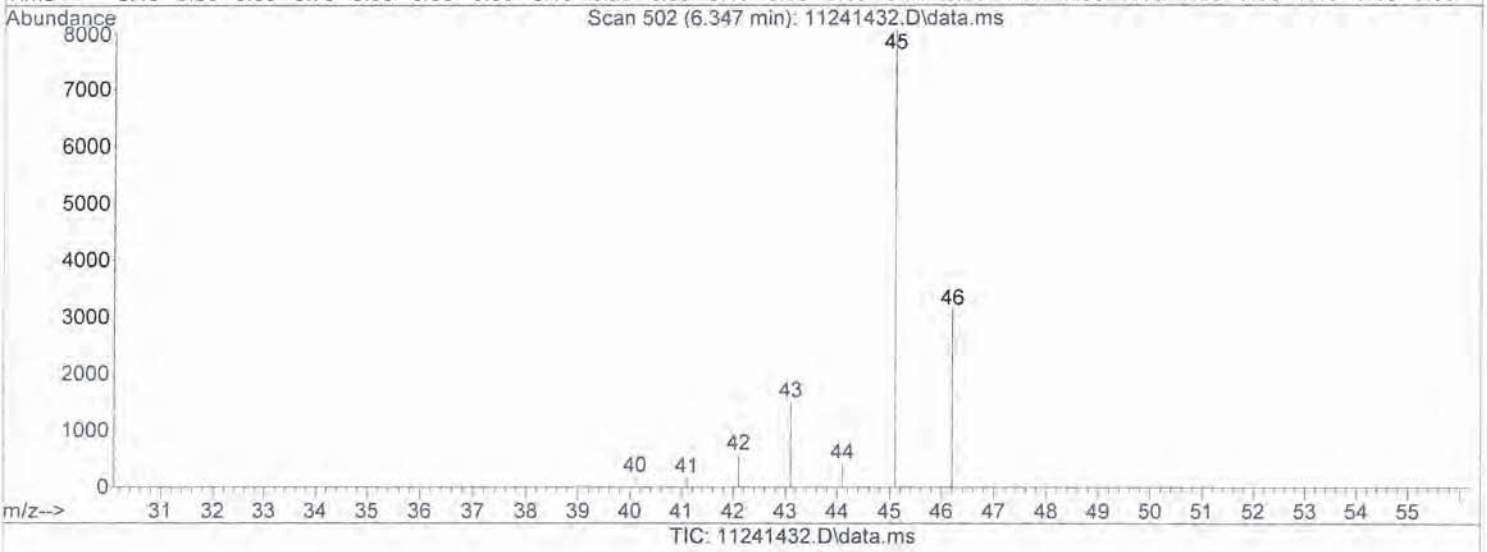
Ion	Exp%	Act%
45.10	100	100
46.10	37.30	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File: I:\MS16\DATA\2014_11\24\11241432.D
Acq On : 25 Nov 2014 8:30 Operator: LH
Sample : 0.4ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201408 (12/19)
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Nov 25 09:21:09 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:18:18 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 11241432.D\data.ms

(10) Ethanol (T)

6.347min (-0.115) 2.17ng m

response 23801

ion	Exp%	Act%
45.10	100	100
46.10	37.30	0.00#
0.00	0.00	0.00
0.00	0.00	0.00

WP
LH 11/25/14

CR 12/2/14

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241417.D
Acq On : 24 Nov 2014 19:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201407 (12/19)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 25 07:07:45 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

11/25/14

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	169149	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.33	114	758383	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	266641	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.05	65	181914	11.866	ng		-0.02
Spiked Amount 12.500			Recovery = 94.96%				
57) Toluene-d8 (SS2)	15.78	98	654586	13.254	ng		0.00
Spiked Amount 12.500			Recovery = 106.00%				
73) Bromofluorobenzene (SS3)	19.04	174	335817	13.690	ng		0.00
Spiked Amount 12.500			Recovery = 109.52%				
Target Compounds							Qvalue
2) Propene	4.12	42	15230	0.957	ng		99
3) Dichlorodifluoromethan...	4.27	85	33856	1.091	ng		100
4) Chloromethane	4.56	50	25070	1.233	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.81	135	21893	1.210	ng		99
6) Vinyl Chloride	4.98	62	24554	1.140	ng		99
7) 1,3-Butadiene	5.24	54	15703	1.123	ng		99
8) Bromomethane	5.68	94	19525	1.241	ng		99
9) Chloroethane	6.02	64	14132	1.176	ng		100
10) Ethanol	6.34	45	59710	5.658	ng		99
11) Acetonitrile	6.63	41	29622	1.111	ng		91
12) Acrolein	6.83	56	10021	1.060	ng		99
13) Acetone	7.03	58	69428	5.401	ng		99
14) Trichlorofluoromethane	7.29	101	28671	1.267	ng		100
15) 2-Propanol (Isopropanol)	7.51	45	77466	2.220	ng		97
16) Acrylonitrile	7.78	53	22442	1.173	ng		99
17) 1,1-Dichloroethene	8.25	96	20100	1.237	ng		99
18) 2-Methyl-2-Propanol (t...	8.40	59	78887	2.310	ng		97
19) Methylene Chloride	8.46	84	21851	1.285	ng		99
20) 3-Chloro-1-propene (Al...	8.63	41	18780	1.118	ng		99
21) Trichlorotrifluoroethane	8.89	151	18706	1.359	ng		100
22) Carbon Disulfide	8.74	76	68394	1.124	ng		98
23) trans-1,2-Dichloroethene	9.75	61	23054	1.153	ng		100
24) 1,1-Dichloroethane	9.99	63	30125	1.153	ng		98
25) Methyl tert-Butyl Ether	10.11	73	50896	1.244	ng		100
26) Vinyl Acetate	10.26	86	22410	6.550	ng	#	86
27) 2-Butanone (MEK)	10.52	72	11688	1.110	ng	#	88
28) cis-1,2-Dichloroethene	11.02	61	23028	1.201	ng		98
29) Diisopropyl Ether	11.33	87	18903	1.339	ng		95
30) Ethyl Acetate	11.33	61	12093	2.373	ng		96
31) n-Hexane	11.31	57	24110	1.102	ng		98
32) Chloroform	11.36	83	31486	1.283	ng		99
34) Tetrahydrofuran (THF)	11.79	72	12508	1.259	ng		98
35) Ethyl tert-Butyl Ether	11.92	87	21883	1.278	ng		97
36) 1,2-Dichloroethane	12.17	62	18825	1.260	ng		99
38) 1,1,1-Trichloroethane	12.45	97	25881	1.235	ng		99
39) Isopropyl Acetate	12.89	61	21959	2.567	ng		97
40) 1-Butanol	12.91	56	32345	2.399	ng		92
41) Benzene	12.94	78	76220	1.160	ng		100
42) Carbon Tetrachloride	13.09	117	23492	1.349	ng		99
43) Cyclohexane	13.23	84	55429	2.446	ng		98
44) tert-Amyl Methyl Ether	13.58	73	47892	1.182	ng		99
45) 1,2-Dichloropropane	13.79	63	17368	1.219	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241417.D
Acq On : 24 Nov 2014 19:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201407 (12/19)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 25 07:07:45 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

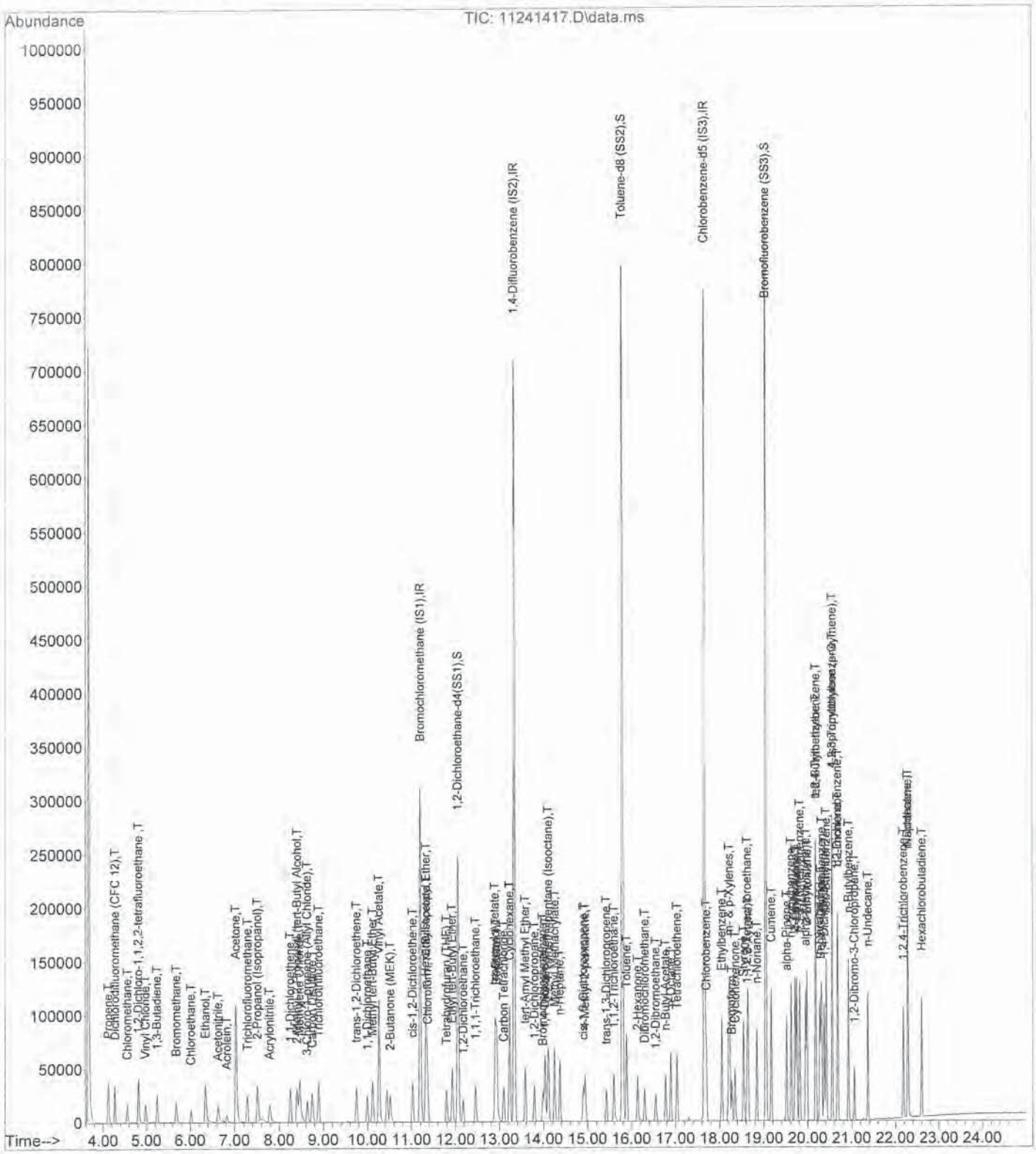
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
46) Bromodichloromethane	13.98	83	23140	1.253	ng	97
47) Trichloroethene	14.03	130	23534	1.344	ng	99
48) 1,4-Dioxane	14.02	88	16057	1.209	ng	99
49) 2,2,4-Trimethylpentane...	14.10	57	75434	1.289	ng	100
50) Methyl Methacrylate	14.25	100	15465	2.612	ng	98
51) n-Heptane	14.36	71	17438	1.349	ng	99
52) cis-1,3-Dichloropropene	14.90	75	25513	1.198	ng	99
53) 4-Methyl-2-pentanone	14.94	58	15343	1.181	ng	96
54) trans-1,3-Dichloropropene	15.42	75	21803	1.175	ng	99
55) 1,1,2-Trichloroethane	15.60	97	19636	1.245	ng	99
58) Toluene	15.88	91	78258	1.290	ng	99
59) 2-Hexanone	16.14	43	33243	1.207	ng	99
60) Dibromochloromethane	16.29	129	22199	1.427	ng	99
61) 1,2-Dibromoethane	16.55	107	22010	1.419	ng	99
62) n-Butyl Acetate	16.77	43	36502	1.339	ng	99
63) n-Octane	16.89	57	13284	1.326	ng	100
64) Tetrachloroethene	17.03	166	26489	1.385	ng	100
65) Chlorobenzene	17.69	112	54610	1.406	ng	100
66) Ethylbenzene	18.05	91	82670	1.366	ng	100
67) m- & p-Xylenes	18.21	91	128915	2.699	ng	98
68) Bromoform	18.27	173	21745	1.582	ng	99
69) Styrene	18.54	104	57886	1.546	ng	99
70) o-Xylene	18.64	91	68054	1.399	ng	99
71) n-Nonane	18.84	43	29613	1.318	ng	97
72) 1,1,2,2-Tetrachloroethane	18.62	83	36343	1.447	ng	100
74) Cumene	19.17	105	91691	1.411	ng	100
75) alpha-Pinene	19.52	93	41967	1.373	ng	93
76) n-Propylbenzene	19.62	91	106566	1.357	ng	100
77) 3-Ethyltoluene	19.71	105	91221	1.481	ng	95
78) 4-Ethyltoluene	19.75	105	91898	1.511	ng	95
79) 1,3,5-Trimethylbenzene	19.81	105	76847	1.512	ng	100
80) alpha-Methylstyrene	19.95	118	42437	1.526	ng	99
81) 2-Ethyltoluene	19.98	105	92678	1.540	ng	99
82) 1,2,4-Trimethylbenzene	20.18	105	77720	1.542	ng	99
83) n-Decane	20.27	57	36853	1.430	ng	98
84) Benzyl Chloride	20.29	91	59714	1.474	ng	97
85) 1,3-Dichlorobenzene	20.31	146	55185	1.649	ng	100
86) 1,4-Dichlorobenzene	20.37	146	53700	1.492	ng	100
87) sec-Butylbenzene	20.41	105	106702	1.555	ng	100
88) 4-Isopropyltoluene (p-...	20.55	119	99865	1.576	ng	99
89) 1,2,3-Trimethylbenzene	20.55	105	79911	1.506	ng	98
90) 1,2-Dichlorobenzene	20.67	146	52711	1.620	ng	98
91) d-Limonene	20.68	68	25964	1.451	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.06	157	17911	1.578	ng	94
93) n-Undecane	21.37	57	36786	1.366	ng	98
94) 1,2,4-Trichlorobenzene	22.18	180	38868	1.532	ng	98
95) Naphthalene	22.28	128	116138	1.569	ng	99
96) n-Dodecane	22.28	57	35021	1.481	ng	97
97) Hexachlorobutadiene	22.60	225	25527	1.633	ng	99
98) Cyclohexanone	18.35	55	23862	1.308	ng	100
99) tert-Butylbenzene	20.18	119	79099	1.568	ng	100
100) n-Butylbenzene	20.92	91	81969	1.552	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241417.D
Acq On : 24 Nov 2014 19:13 Operator: LH
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201407 (12/19)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 25 07:07:45 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241418.D
Acq On : 24 Nov 2014 19:47 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201407 (12/19)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 25 07:07:47 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 11/25/14

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	164282	12.500	ng		-0.01
37) 1,4-Difluorobenzene (IS2)	13.33	114	720749	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	260104	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.06	65	174076	11.691	ng		0.00
Spiked Amount 12.500			Recovery = 93.52%				
57) Toluene-d8 (SS2)	15.78	98	625243	12.978	ng		0.00
Spiked Amount 12.500			Recovery = 103.84%				
73) Bromofluorobenzene (SS3)	19.04	174	320667	13.401	ng		0.00
Spiked Amount 12.500			Recovery = 107.20%				
Target Compounds							Qvalue
2) Propene	4.11	42	68182	4.412	ng		100
3) Dichlorodifluoromethan...	4.26	85	147635	4.900	ng		100
4) Chloromethane	4.55	50	104609	5.296	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.81	135	99234	5.648	ng		99
6) Vinyl Chloride	4.97	62	110992	5.304	ng		100
7) 1,3-Butadiene	5.24	54	72121	5.310	ng		99
8) Bromomethane	5.68	94	80806	5.289	ng		100
9) Chloroethane	6.01	64	58797	5.037	ng		99
10) Ethanol	6.36	45	259422	25.310	ng		99
11) Acetonitrile	6.62	41	129599	5.006	ng		98
12) Acrolein	6.82	56	48930	5.331	ng		99
13) Acetone	7.03	58	303637	24.322	ng		100
14) Trichlorofluoromethane	7.28	101	120446	5.479	ng		100
15) 2-Propanol (Isopropanol)	7.52	45	359646	10.610	ng		98
16) Acrylonitrile	7.79	53	103264	5.557	ng		99
17) 1,1-Dichloroethene	8.24	96	90592	5.739	ng		100
18) 2-Methyl-2-Propanol (t...	8.40	59	360303	10.865	ng		99
19) Methylene Chloride	8.46	84	93348	5.652	ng		100
20) 3-Chloro-1-propene (Al...	8.63	41	88447	5.420	ng		100
21) Trichlorotrifluoroethane	8.89	151	76155	5.696	ng		99
22) Carbon Disulfide	8.74	76	304671	5.154	ng		100
23) trans-1,2-Dichloroethene	9.75	61	106878	5.504	ng		99
24) 1,1-Dichloroethane	10.00	63	132389	5.217	ng		99
25) Methyl tert-Butyl Ether	10.11	73	222473	5.597	ng		100
26) Vinyl Acetate	10.26	86	102479	30.839	ng	#	94
27) 2-Butanone (MEK)	10.51	72	55303	5.407	ng		100
28) cis-1,2-Dichloroethene	11.03	61	100233	5.381	ng		100
29) Diisopropyl Ether	11.33	87	80136	5.844	ng	#	92
30) Ethyl Acetate	11.33	61	55645	11.244	ng		99
31) n-Hexane	11.31	57	105955	4.988	ng		99
32) Chloroform	11.37	83	138827	5.825	ng		100
34) Tetrahydrofuran (THF)	11.79	72	54880	5.689	ng		99
35) Ethyl tert-Butyl Ether	11.92	87	97555	5.867	ng		100
36) 1,2-Dichloroethane	12.18	62	80517	5.548	ng		100
38) 1,1,1-Trichloroethane	12.46	97	111825	5.615	ng		100
39) Isopropyl Acetate	12.89	61	95807	11.785	ng		96
40) 1-Butanol	12.90	56	162614	12.688	ng		100
41) Benzene	12.94	78	321522	5.149	ng		99
42) Carbon Tetrachloride	13.09	117	102226	6.177	ng		100
43) Cyclohexane	13.23	84	257617	11.961	ng		99
44) tert-Amyl Methyl Ether	13.58	73	216473	5.623	ng		99
45) 1,2-Dichloropropane	13.79	63	75622	5.586	ng		98

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241418.D
Acq On : 24 Nov 2014 19:47 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201407 (12/19)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 25 07:07:47 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

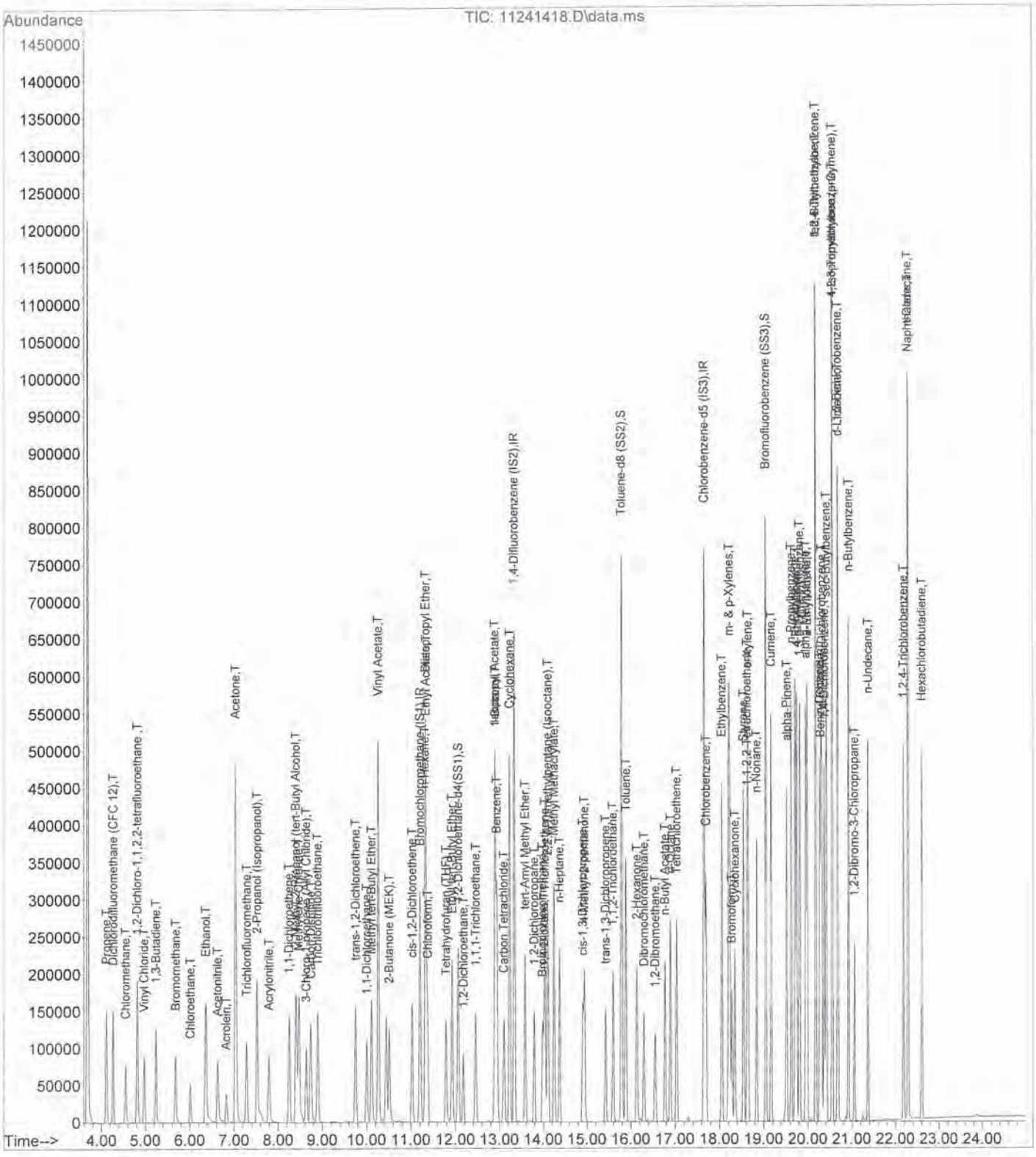
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
46) Bromodichloromethane	13.98	83	101418	5.778	ng	100
47) Trichloroethene	14.03	130	99090	5.955	ng	99
48) 1,4-Dioxane	14.01	88	74121	5.873	ng	99
49) 2,2,4-Trimethylpentane...	14.10	57	318953	5.733	ng	99
50) Methyl Methacrylate	14.24	100	70661	12.558	ng	97
51) n-Heptane	14.37	71	72072	5.866	ng	99
52) cis-1,3-Dichloropropene	14.90	75	115906	5.727	ng	100
53) 4-Methyl-2-pentanone	14.94	58	70791	5.734	ng	98
54) trans-1,3-Dichloropropene	15.42	75	105367	5.974	ng	100
55) 1,1,2-Trichloroethane	15.59	97	86774	5.790	ng	100
58) Toluene	15.89	91	329959	5.575	ng	100
59) 2-Hexanone	16.13	43	160114	5.960	ng	99
60) Dibromochloromethane	16.30	129	103616	6.827	ng	99
61) 1,2-Dibromoethane	16.55	107	101945	6.740	ng	100
62) n-Butyl Acetate	16.77	43	178531	6.714	ng	99
63) n-Octane	16.89	57	58575	5.994	ng	97
64) Tetrachloroethene	17.03	166	114585	6.143	ng	100
65) Chlorobenzene	17.69	112	241789	6.382	ng	100
66) Ethylbenzene	18.05	91	382135	6.475	ng	99
67) m- & p-Xylenes	18.21	91	600639	12.890	ng	99
68) Bromoform	18.27	173	100918	7.527	ng	100
69) Styrene	18.54	104	265196	7.262	ng	100
70) o-Xylene	18.64	91	307055	6.470	ng	99
71) n-Nonane	18.84	43	129405	5.905	ng	98
72) 1,1,2,2-Tetrachloroethane	18.62	83	160329	6.545	ng	100
74) Cumene	19.17	105	402722	6.353	ng	100
75) alpha-Pinene	19.52	93	199936	6.705	ng	96
76) n-Propylbenzene	19.62	91	475546	6.209	ng	99
77) 3-Ethyltoluene	19.71	105	407193	6.778	ng	95
78) 4-Ethyltoluene	19.75	105	392970	6.624	ng	95
79) 1,3,5-Trimethylbenzene	19.81	105	326454	6.585	ng	99
80) alpha-Methylstyrene	19.95	118	193068	7.119	ng	100
81) 2-Ethyltoluene	19.98	105	391828	6.675	ng	100
82) 1,2,4-Trimethylbenzene	20.17	105	333130	6.775	ng	98
83) n-Decane	20.27	57	156215	6.214	ng	99
84) Benzyl Chloride	20.29	91	294274	7.445	ng	99
85) 1,3-Dichlorobenzene	20.31	146	235478	7.214	ng	100
86) 1,4-Dichlorobenzene	20.37	146	235621	6.709	ng	99
87) sec-Butylbenzene	20.41	105	456241	6.814	ng	100
88) 4-Isopropyltoluene (p-...	20.55	119	429661	6.952	ng	99
89) 1,2,3-Trimethylbenzene	20.55	105	346521	6.694	ng	98
90) 1,2-Dichlorobenzene	20.67	146	229244	7.222	ng	99
91) d-Limonene	20.68	68	119438	6.842	ng	98
92) 1,2-Dibromo-3-Chloropr...	21.05	157	84961	7.672	ng	98
93) n-Undecane	21.37	57	166035	6.319	ng	99
94) 1,2,4-Trichlorobenzene	22.18	180	184192	7.445	ng	100
95) Naphthalene	22.28	128	539494	7.474	ng	100
96) n-Dodecane	22.28	57	163164	7.075	ng	98
97) Hexachlorobutadiene	22.60	225	111543	7.317	ng	100
98) Cyclohexanone	18.35	55	111162	6.247	ng	100
99) tert-Butylbenzene	20.17	119	332200	6.750	ng	100
100) n-Butylbenzene	20.92	91	367071	7.124	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241418.D
Acq On : 24 Nov 2014 19:47 Operator: LH
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201407 (12/19)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 25 07:07:47 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241419.D
Acq On : 24 Nov 2014 20:21 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201403 (12/19)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 07:07:50 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LR 11/25/14

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.21	130	164492	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.34	114	748186	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	274519	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.07	65	175351	11.761	ng	0.00
Spiked Amount 12.500			Recovery =	94.08%		
57) Toluene-d8 (SS2)	15.79	98	665002	13.078	ng	0.00
Spiked Amount 12.500			Recovery =	104.64%		
73) Bromofluorobenzene (SS3)	19.04	174	324493	12.849	ng	0.00
Spiked Amount 12.500			Recovery =	102.80%		
Target Compounds						Qvalue
2) Propene	4.10	42	337871	21.835	ng	100
3) Dichlorodifluoromethan...	4.26	85	790804	26.211	ng	100
4) Chloromethane	4.54	50	571153	28.876	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.81	135	496312	28.211	ng	100
6) Vinyl Chloride	4.97	62	586670	28.000	ng	100
7) 1,3-Butadiene	5.24	54	389945	28.675	ng	100
8) Bromomethane	5.68	94	462802	30.254	ng	100
9) Chloroethane	6.01	64	336320	28.775	ng	100
10) Ethanol	6.40	45	1318230	128.447	ng	100
11) Acetonitrile	6.64	41	684279	26.399	ng	100
12) Acrolein	6.83	56	260931	28.390	ng	100
13) Acetone	7.04	58	1486579	118.929	ng	100
14) Trichlorofluoromethane	7.28	101	628933	28.573	ng	100
15) 2-Propanol (Isopropanol)	7.54	45	1870439	55.109	ng	100
16) Acrylonitrile	7.80	53	559742	30.081	ng	100
17) 1,1-Dichloroethene	8.25	96	478305	30.264	ng	100
18) 2-Methyl-2-Propanol (t...	8.42	59	1962754	59.111	ng	100
19) Methylene Chloride	8.48	84	477186	28.855	ng	100
20) 3-Chloro-1-propene (Al...	8.64	41	499434	30.566	ng	100
21) Trichlorotrifluoroethane	8.90	151	410678	30.675	ng	100
22) Carbon Disulfide	8.74	76	1620385	27.375	ng	100
23) trans-1,2-Dichloroethene	9.76	61	555995	28.594	ng	100
24) 1,1-Dichloroethane	10.01	63	683487	26.899	ng	100
25) Methyl tert-Butyl Ether	10.11	73	1175259	29.529	ng	100
26) Vinyl Acetate	10.27	86	526487	158.235	ng	100
27) 2-Butanone (MEK)	10.52	72	289537	28.271	ng	100
28) cis-1,2-Dichloroethene	11.03	61	540129	28.962	ng	100
29) Diisopropyl Ether	11.33	87	413231	30.095	ng	100
30) Ethyl Acetate	11.34	61	286324	57.783	ng	100
31) n-Hexane	11.32	57	486654	22.879	ng	100
32) Chloroform	11.38	83	718541	30.109	ng	100
34) Tetrahydrofuran (THF)	11.79	72	286978	29.709	ng	100
35) Ethyl tert-Butyl Ether	11.93	87	508189	30.526	ng	100
36) 1,2-Dichloroethane	12.18	62	421169	28.984	ng	100
38) 1,1,1-Trichloroethane	12.46	97	600110	29.026	ng	100
39) Isopropyl Acetate	12.90	61	516412	61.191	ng	100
40) 1-Butanol	12.91	56	818388	61.514	ng	100
41) Benzene	12.94	78	1641362	25.322	ng	100
42) Carbon Tetrachloride	13.10	117	553067	32.194	ng	100
43) Cyclohexane	13.23	84	1276301	57.085	ng	100
44) tert-Amyl Methyl Ether	13.58	73	1176364	29.437	ng	100
45) 1,2-Dichloropropane	13.79	63	409511	29.138	ng	100

Data File: I:\MS16\DATA\2014_11\24\11241419.D
Acq On : 24 Nov 2014 20:21 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201403 (12/19)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 07:07:50 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

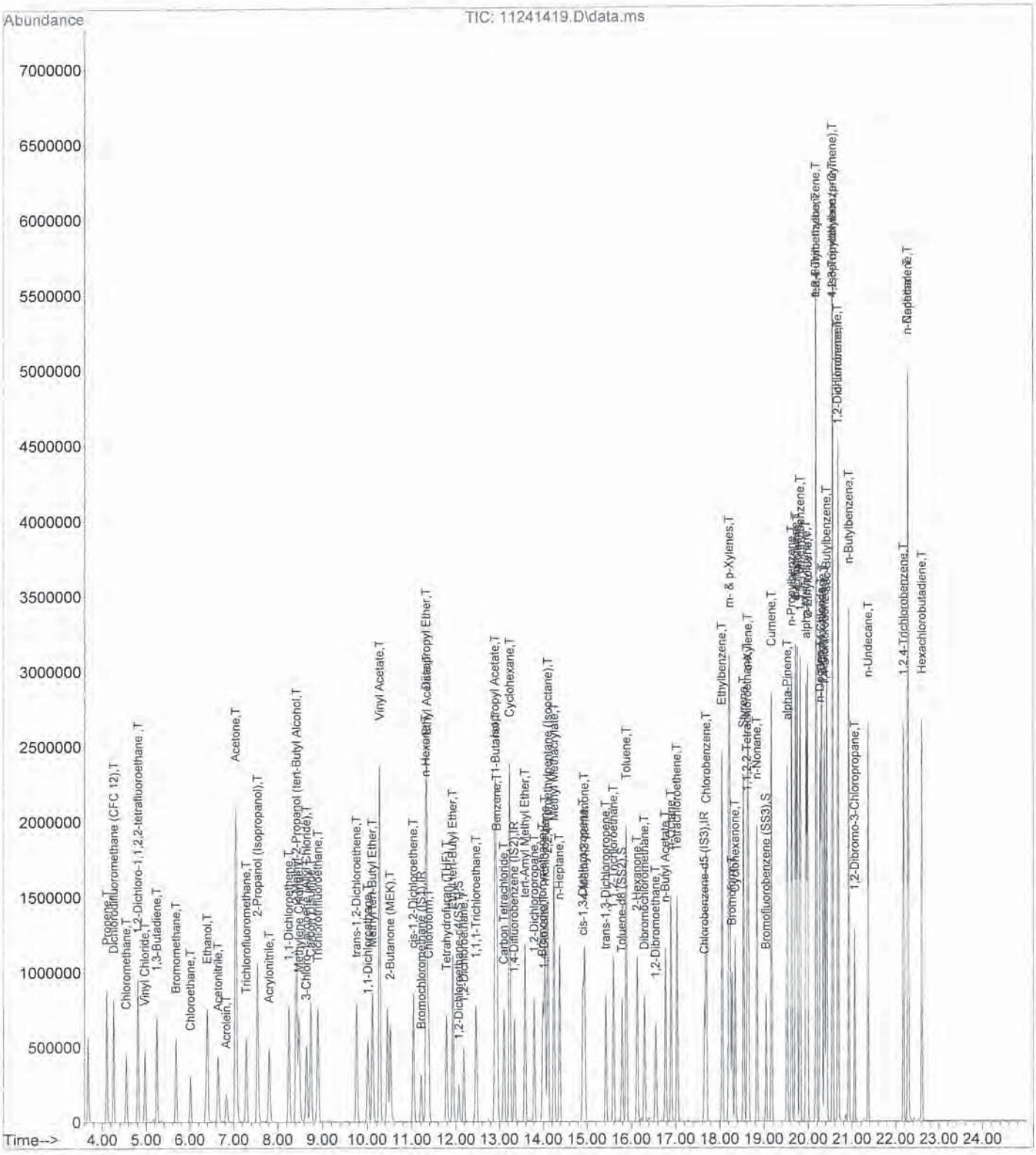
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
46) Bromodichloromethane	13.99	83	576888	31.663	ng	100
47) Trichloroethene	14.04	130	522752	30.264	ng	100
48) 1,4-Dioxane	14.01	88	389246	29.711	ng	100
49) 2,2,4-Trimethylpentane...	14.11	57	1606933	27.825	ng	100
50) Methyl Methacrylate	14.25	100	384789	65.880	ng	100
51) n-Heptane	14.37	71	365190	28.634	ng	100
52) cis-1,3-Dichloropropene	14.90	75	660213	31.425	ng	100
53) 4-Methyl-2-pentanone	14.94	58	400916	31.283	ng	100
54) trans-1,3-Dichloropropene	15.42	75	594590	32.477	ng	100
55) 1,1,2-Trichloroethane	15.60	97	473129	30.410	ng	100
58) Toluene	15.89	91	1809588	28.968	ng	100
59) 2-Hexanone	16.13	43	815944	28.777	ng	100
60) Dibromochloromethane	16.30	129	593378	37.044	ng	100
61) 1,2-Dibromoethane	16.55	107	562214	35.218	ng	100
62) n-Butyl Acetate	16.77	43	934329	33.292	ng	100
63) n-Octane	16.89	57	317279	30.760	ng	100
64) Tetrachloroethene	17.03	166	625020	31.749	ng	100
65) Chlorobenzene	17.70	112	1325288	33.144	ng	100
66) Ethylbenzene	18.05	91	2084588	33.465	ng	100
67) m- & p-Xylenes	18.22	91	3173608	64.529	ng	100
68) Bromoform	18.27	173	580525	41.023	ng	100
69) Styrene	18.54	104	1407140	36.509	ng	100
70) o-Xylene	18.64	91	1583385	31.612	ng	100
71) n-Nonane	18.84	43	668285	28.892	ng	100
72) 1,1,2,2-Tetrachloroethane	18.62	83	857822	33.178	ng	100
74) Cumene	19.17	105	2131987	31.866	ng	100
75) alpha-Pinene	19.52	93	1058275	33.626	ng	100
76) n-Propylbenzene	19.62	91	2501233	30.943	ng	100
77) 3-Ethyltoluene	19.71	105	2101899	33.151	ng	100
78) 4-Ethyltoluene	19.75	105	2133264	34.070	ng	100
79) 1,3,5-Trimethylbenzene	19.81	105	1749579	33.437	ng	100
80) alpha-Methylstyrene	19.95	118	1035333	36.169	ng	100
81) 2-Ethyltoluene	19.98	105	2075630	33.505	ng	100
82) 1,2,4-Trimethylbenzene	20.18	105	1759788	33.911	ng	100
83) n-Decane	20.27	57	808873	30.484	ng	100
84) Benzyl Chloride	20.29	91	1598428	38.316	ng	100
85) 1,3-Dichlorobenzene	20.31	146	1255458	36.441	ng	100
86) 1,4-Dichlorobenzene	20.37	146	1237945	33.399	ng	100
87) sec-Butylbenzene	20.41	105	2386098	33.765	ng	100
88) 4-Isopropyltoluene (p-...	20.55	119	2139320	32.799	ng	100
89) 1,2,3-Trimethylbenzene	20.55	105	1776364	32.511	ng	100
90) 1,2-Dichlorobenzene	20.67	146	1170835	34.948	ng	100
91) d-Limonene	20.68	68	602458	32.698	ng	100
92) 1,2-Dibromo-3-Chloropr...	21.06	157	471835	40.369	ng	100
93) n-Undecane	21.37	57	848761	30.608	ng	100
94) 1,2,4-Trichlorobenzene	22.18	180	991633	37.976	ng	100
95) Naphthalene	22.28	128	2749235	36.087	ng	100
96) n-Dodecane	22.28	57	806268	33.123	ng	100
97) Hexachlorobutadiene	22.60	225	600458	37.319	ng	100
98) Cyclohexanone	18.35	55	576326	30.685	ng	100
99) tert-Butylbenzene	20.18	119	1735711	33.416	ng	100
100) n-Butylbenzene	20.92	91	1854790	34.105	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241419.D
Acq On : 24 Nov 2014 20:21 Operator: LH
Sample : 25ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201403 (12/19)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 07:07:50 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241420.D
Acq On : 24 Nov 2014 20:55 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201403 (12/19)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 07:07:52 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

VK 11/25/14

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.21	130	161285	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.34	114	752768	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	273086	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.07	65	175490	12.005	ng		0.00
Spiked Amount 12.500			Recovery =	96.00%			
57) Toluene-d8 (SS2)	15.79	98	666907	13.185	ng		0.00
Spiked Amount 12.500			Recovery =	105.44%			
73) Bromofluorobenzene (SS3)	19.04	174	327740	13.045	ng		0.00
Spiked Amount 12.500			Recovery =	104.40%			
Target Compounds							Qvalue
2) Propene	4.09	42	655937	43.232	ng		100
3) Dichlorodifluoromethan...	4.25	85	1476004	49.895	ng		100
4) Chloromethane	4.54	50	1056185	54.460	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.81	135	998979	57.913	ng		100
6) Vinyl Chloride	4.97	62	1151641	56.057	ng		100
7) 1,3-Butadiene	5.24	54	787257	59.044	ng		99
8) Bromomethane	5.68	94	843354	56.228	ng		100
9) Chloroethane	6.01	64	623131	54.375	ng		100
10) Ethanol	6.41	45	2477291	246.185	ng		100
11) Acetonitrile	6.66	41	1309781	51.534	ng		100
12) Acrolein	6.84	56	502914	55.807	ng		99
13) Acetone	7.06	58	2798919	228.370	ng		100
14) Trichlorofluoromethane	7.28	101	1245791	57.723	ng		100
15) 2-Propanol (Isopropanol)	7.56	45	3498226	105.117	ng		100
16) Acrylonitrile	7.82	53	1060441	58.123	ng		99
17) 1,1-Dichloroethene	8.25	96	909531	58.693	ng		100
18) 2-Methyl-2-Propanol (t...	8.43	59	3522152	108.184	ng		99
19) Methylene Chloride	8.49	84	919829	56.728	ng		99
20) 3-Chloro-1-propene (Al...	8.65	41	971513	60.639	ng		98
21) Trichlorotrifluoroethane	8.90	151	727562	55.424	ng		99
22) Carbon Disulfide	8.74	76	3109397	53.576	ng		100
23) trans-1,2-Dichloroethene	9.76	61	1088398	57.088	ng		100
24) 1,1-Dichloroethane	10.02	63	1344775	53.977	ng		100
25) Methyl tert-Butyl Ether	10.11	73	2272076	58.222	ng		100
26) Vinyl Acetate	10.28	86	995452	305.131	ng	#	91
27) 2-Butanone (MEK)	10.52	72	561888	55.954	ng		99
28) cis-1,2-Dichloroethene	11.04	61	1033000	56.492	ng		100
29) Diisopropyl Ether	11.33	87	773126	57.426	ng		96
30) Ethyl Acetate	11.34	61	531058	109.303	ng		98
31) n-Hexane	11.32	57	940627	45.101	ng		100
32) Chloroform	11.38	83	1372255	58.645	ng		100
34) Tetrahydrofuran (THF)	11.79	72	551868	58.268	ng		99
35) Ethyl tert-Butyl Ether	11.93	87	959546	58.784	ng		99
36) 1,2-Dichloroethane	12.18	62	821611	57.665	ng		100
38) 1,1,1-Trichloroethane	12.46	97	1140406	54.823	ng		100
39) Isopropyl Acetate	12.90	61	952416	112.168	ng		98
40) 1-Butanol	12.92	56	1531394	114.407	ng		99
41) Benzene	12.95	78	3035690	46.548	ng		100
42) Carbon Tetrachloride	13.11	117	1059484	61.298	ng		100
43) Cyclohexane	13.24	84	2415186	107.367	ng		99
44) tert-Amyl Methyl Ether	13.58	73	2239076	55.690	ng		100
45) 1,2-Dichloropropane	13.79	63	779789	55.147	ng		100

Data File: I:\MS16\DATA\2014_11\24\11241420.D
Acq On : 24 Nov 2014 20:55 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201403 (12/19)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 07:07:52 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

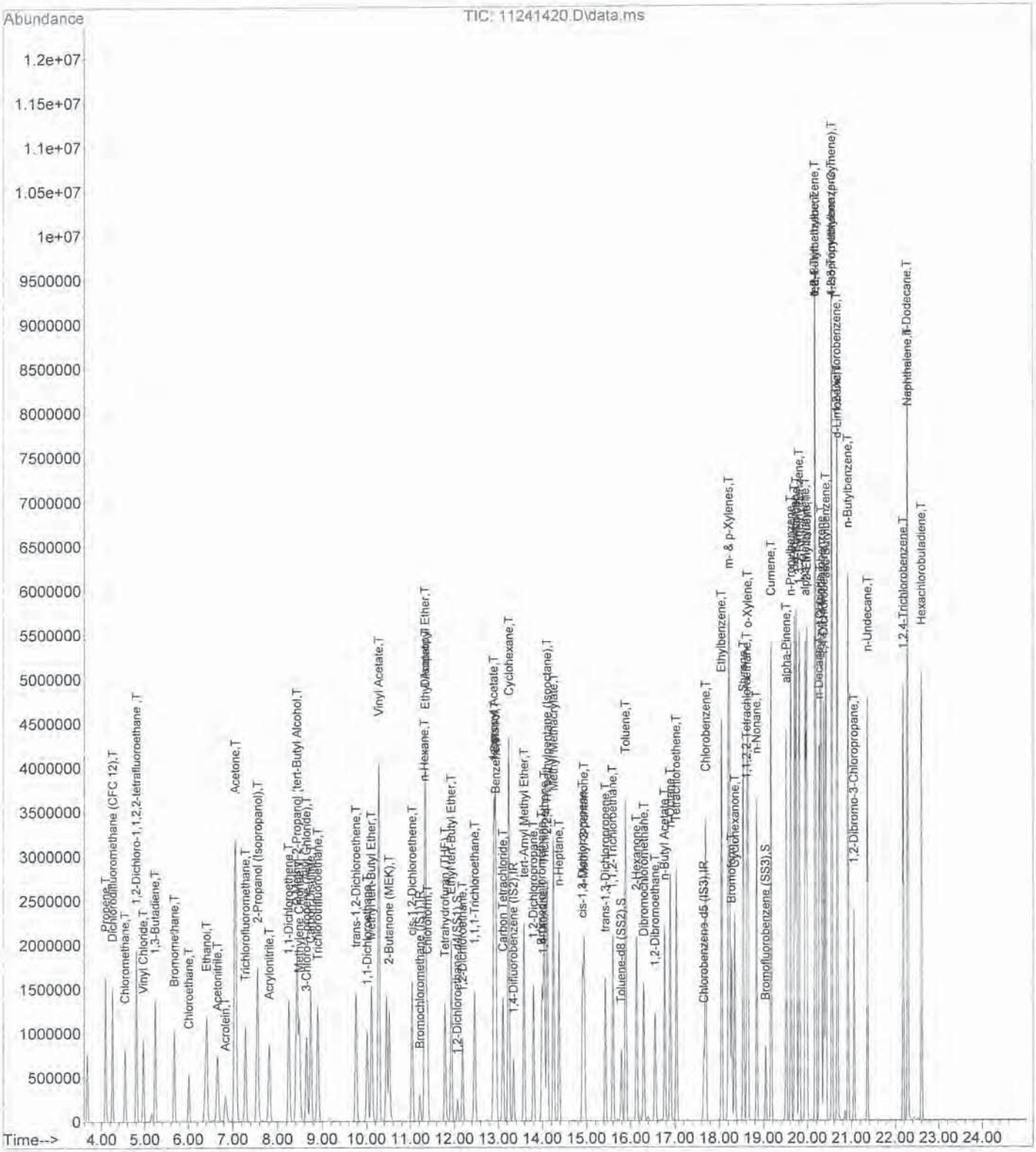
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
46) Bromodichloromethane	13.99	83	1106667	60.371	ng	100
47) Trichloroethene	14.04	130	1007931	57.997	ng	100
48) 1,4-Dioxane	14.01	88	738618	56.036	ng	99
49) 2,2,4-Trimethylpentane...	14.11	57	2999307	51.618	ng	99
50) Methyl Methacrylate	14.25	100	734298	124.954	ng	99
51) n-Heptane	14.38	71	677321	52.784	ng	100
52) cis-1,3-Dichloropropene	14.90	75	1279799	60.546	ng	100
53) 4-Methyl-2-pentanone	14.94	58	722741	56.052	ng	99
54) trans-1,3-Dichloropropene	15.43	75	1151986	62.540	ng	100
55) 1,1,2-Trichloroethane	15.60	97	889367	56.815	ng	99
58) Toluene	15.89	91	3414410	54.946	ng	100
59) 2-Hexanone	16.14	43	1562533	55.396	ng	99
60) Dibromochloromethane	16.30	129	1120189	70.299	ng	100
61) 1,2-Dibromoethane	16.55	107	1077493	67.849	ng	100
62) n-Butyl Acetate	16.77	43	1782703	63.855	ng	100
63) n-Octane	16.89	57	595435	58.031	ng	99
64) Tetrachloroethene	17.03	166	1199932	61.272	ng	100
65) Chlorobenzene	17.70	112	2491895	62.646	ng	100
66) Ethylbenzene	18.05	91	3898302	62.911	ng	100
67) m- & p-Xylenes	18.22	91	5942762	121.469	ng	99
68) Bromoform	18.28	173	1134778	80.610	ng	100
69) Styrene	18.54	104	2664536	69.496	ng	99
70) o-Xylene	18.64	91	2973110	59.668	ng	100
71) n-Nonane	18.84	43	1224010	53.196	ng	98
72) 1,1,2,2-Tetrachloroethane	18.62	83	1569749	61.032	ng	100
74) Cumene	19.17	105	4022979	60.446	ng	100
75) alpha-Pinene	19.52	93	2002593	63.965	ng	99
76) n-Propylbenzene	19.62	91	4636753	57.662	ng	100
77) 3-Ethyltoluene	19.71	105	4100904	65.019	ng	95
78) 4-Ethyltoluene	19.75	105	3638618	58.417	ng	95
79) 1,3,5-Trimethylbenzene	19.81	105	3194381	61.370	ng	100
80) alpha-Methylstyrene	19.95	118	1893356	66.491	ng	99
81) 2-Ethyltoluene	19.98	105	3765177	61.097	ng	100
82) 1,2,4-Trimethylbenzene	20.18	105	3137977	60.785	ng	99
83) n-Decane	20.27	57	1441996	54.630	ng	99
84) Benzyl Chloride	20.29	91	2974282	71.670	ng	99
85) 1,3-Dichlorobenzene	20.31	146	2282316	66.594	ng	100
86) 1,4-Dichlorobenzene	20.37	146	2280511	61.849	ng	100
87) sec-Butylbenzene	20.42	105	4267091	60.699	ng	99
88) 4-Isopropyltoluene (p-...	20.56	119	3762561	57.988	ng	99
89) 1,2,3-Trimethylbenzene	20.55	105	3171762	58.355	ng	99
90) 1,2-Dichlorobenzene	20.67	146	2122750	63.694	ng	100
91) d-Limonene	20.68	68	1062426	57.965	ng	98
92) 1,2-Dibromo-3-Chloropr...	21.06	157	899131	77.331	ng	99
93) n-Undecane	21.37	57	1533198	55.579	ng	99
94) 1,2,4-Trichlorobenzene	22.18	180	1890508	72.779	ng	100
95) Naphthalene	22.29	128	5009305	66.098	ng	100
96) n-Dodecane	22.28	57	1432206	59.146	ng	98
97) Hexachlorobutadiene	22.60	225	1150362	71.871	ng	100
98) Cyclohexanone	18.35	55	1096937	58.710	ng	100
99) tert-Butylbenzene	20.18	119	3062987	59.278	ng	100
100) n-Butylbenzene	20.92	91	3424994	63.308	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241420.D
Acq On : 24 Nov 2014 20:55 Operator: LH
Sample : 50ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201403 (12/19)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 07:07:52 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241421.D
Acq On : 24 Nov 2014 21:29 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201403 (12/19)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 07:07:53 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 11/25/14

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.22	130	173804	12.500	ng		0.01
37) 1,4-Difluorobenzene (IS2)	13.35	114	800203	12.500	ng		0.01
56) Chlorobenzene-d5 (IS3)	17.65	82	283884	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.08	65	188485	11.965	ng		0.01
Spiked Amount 12.500			Recovery =	95.68%			
57) Toluene-d8 (SS2)	15.79	98	689112	13.105	ng		0.00
Spiked Amount 12.500			Recovery =	104.88%			
73) Bromofluorobenzene (SS3)	19.04	174	339058	12.983	ng		0.00
Spiked Amount 12.500			Recovery =	103.84%			
Target Compounds							Qvalue
2) Propene	4.10	42	1216599	74.409	ng		99
3) Dichlorodifluoromethan...	4.26	85	2871296	90.070	ng		100
4) Chloromethane	4.55	50	1909178	91.352	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.82	135	1961339	105.513	ng		100
6) Vinyl Chloride	4.98	62	2205471	99.621	ng		100
7) 1,3-Butadiene	5.25	54	1547932	107.731	ng		99
8) Bromomethane	5.69	94	1657682	102.560	ng		100
9) Chloroethane	6.02	64	1167774	94.561	ng		100
10) Ethanol	6.46	45	4660351	429.771	ng		99
11) Acetonitrile	6.69	41	2603439	95.056	ng		100
12) Acrolein	6.86	56	978351	100.745	ng		99
13) Acetone	7.08	58	5113084	387.138	ng		99
14) Trichlorofluoromethane	7.29	101	2426212	104.320	ng		100
15) 2-Propanol (Isopropanol)	7.59	45	6287049	175.310	ng		100
16) Acrylonitrile	7.83	53	2103757	107.001	ng		99
17) 1,1-Dichloroethene	8.26	96	1791508	107.280	ng		99
18) 2-Methyl-2-Propanol (t...	8.46	59	5794433	165.159	ng		99
19) Methylene Chloride	8.50	84	1764187	100.965	ng		99
20) 3-Chloro-1-propene (Al...	8.66	41	1884642	109.161	ng		99
21) Trichlorotrifluoroethane	8.90	151	1540001	108.864	ng		98
22) Carbon Disulfide	8.75	76	6014677	96.169	ng		99
23) trans-1,2-Dichloroethene	9.77	61	2150057	104.651	ng		99
24) 1,1-Dichloroethane	10.02	63	2710250	100.950	ng		100
25) Methyl tert-Butyl Ether	10.12	73	4390436	104.402	ng		100
26) Vinyl Acetate	10.30	86	1964192	558.707	ng	#	75
27) 2-Butanone (MEK)	10.53	72	1119319	103.436	ng		94
28) cis-1,2-Dichloroethene	11.04	61	2078233	105.467	ng		99
29) Diisopropyl Ether	11.34	87	1482399	102.178	ng	#	85
30) Ethyl Acetate	11.36	61	991406	189.355	ng		95
31) n-Hexane	11.32	57	1895865	84.356	ng		99
32) Chloroform	11.40	83	2738539	108.604	ng		100
34) Tetrahydrofuran (THF)	11.79	72	1104514	108.218	ng		98
35) Ethyl tert-Butyl Ether	11.93	87	1900485	108.041	ng		97
36) 1,2-Dichloroethane	12.19	62	1674036	109.031	ng		100
38) 1,1,1-Trichloroethane	12.47	97	2290015	103.563	ng		100
39) Isopropyl Acetate	12.90	61	1784475	197.702	ng		93
40) 1-Butanol	12.95	56	2806192	197.216	ng		99
41) Benzene	12.95	78	5744037	82.856	ng		99
42) Carbon Tetrachloride	13.11	117	2123820	115.592	ng		99
43) Cyclohexane	13.24	84	4537678	189.765	ng		96
44) tert-Amyl Methyl Ether	13.59	73	4335057	101.429	ng		99
45) 1,2-Dichloropropane	13.80	63	1545126	102.794	ng		100

Data File: I:\MS16\DATA\2014_11\24\11241421.D
Acq On : 24 Nov 2014 21:29 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201403 (12/19)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 07:07:53 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

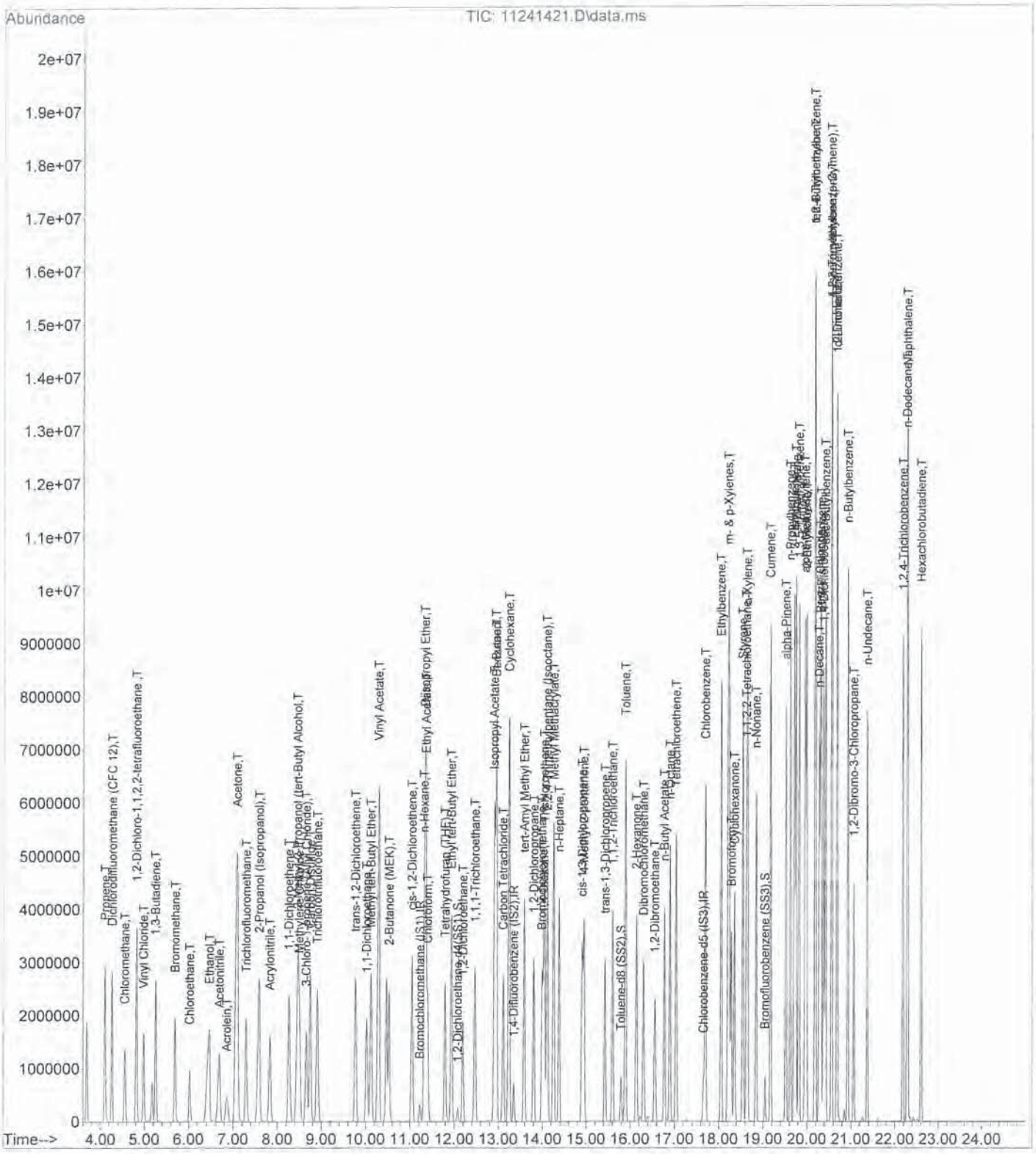
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
46) Bromodichloromethane	13.99	83	2141385	109.893	ng	100
47) Trichloroethene	14.05	130	2038879	110.363	ng	99
48) 1,4-Dioxane	14.02	88	1381847	98.621	ng	98
49) 2,2,4-Trimethylpentane...	14.11	57	5652928	91.520	ng	100
50) Methyl Methacrylate	14.26	100	1391288	222.719	ng	96
51) n-Heptane	14.38	71	1383694	101.439	ng	99
52) cis-1,3-Dichloropropene	14.91	75	2466288	109.761	ng	100
53) 4-Methyl-2-pentanone	14.95	58	1373129	100.180	ng	97
54) trans-1,3-Dichloropropene	15.43	75	2198173	112.262	ng	100
55) 1,1,2-Trichloroethane	15.60	97	1688332	101.461	ng	99
58) Toluene	15.89	91	6437173	99.649	ng	100
59) 2-Hexanone	16.14	43	2918136	99.521	ng	99
60) Dibromochloromethane	16.30	129	2151441	129.880	ng	100
61) 1,2-Dibromoethane	16.55	107	2057444	124.628	ng	99
62) n-Butyl Acetate	16.77	43	3330574	114.760	ng	98
63) n-Octane	16.90	57	1135209	106.429	ng	97
64) Tetrachloroethene	17.04	166	2297543	112.856	ng	100
65) Chlorobenzene	17.70	112	4720308	114.155	ng	100
66) Ethylbenzene	18.05	91	7220035	112.085	ng	100
67) m- & p-Xylenes	18.23	91	10867490	213.680	ng	99
68) Bromoform	18.29	173	2160164	147.613	ng	100
69) Styrene	18.54	104	4917838	123.388	ng	98
70) o-Xylene	18.65	91	5443320	105.089	ng	99
71) n-Nonane	18.84	43	2146884	89.755	ng	95
72) 1,1,2,2-Tetrachloroethane	18.63	83	2863768	107.109	ng	100
74) Cumene	19.17	105	7150007	103.344	ng	99
75) alpha-Pinene	19.52	93	3650595	112.169	ng	98
76) n-Propylbenzene	19.62	91	8331024	99.663	ng	98
77) 3-Ethyltoluene	19.72	105	7036622	107.320	ng	96
78) 4-Ethyltoluene	19.75	105	6903897	106.625	ng	93
79) 1,3,5-Trimethylbenzene	19.82	105	5765830	106.559	ng	99
80) alpha-Methylstyrene	19.96	118	3401802	114.921	ng	98
81) 2-Ethyltoluene	19.99	105	6701310	104.605	ng	99
82) 1,2,4-Trimethylbenzene	20.18	105	5432448	101.228	ng	99
83) n-Decane	20.27	57	2485305	90.574	ng	97
84) Benzyl Chloride	20.30	91	5310060	123.088	ng	98
85) 1,3-Dichlorobenzene	20.32	146	4046662	113.584	ng	100
86) 1,4-Dichlorobenzene	20.38	146	4103729	107.063	ng	100
87) sec-Butylbenzene	20.42	105	7452897	101.985	ng	97
88) 4-Isopropyltoluene (p-...	20.56	119	6337806	93.961	ng	97
89) 1,2,3-Trimethylbenzene	20.56	105	5472919	96.862	ng	98
90) 1,2-Dichlorobenzene	20.68	146	3639714	105.057	ng	100
91) d-Limonene	20.68	68	1770193	92.907	ng	94
92) 1,2-Dibromo-3-Chloropr...	21.06	157	1675459	138.619	ng	99
93) n-Undecane	21.37	57	2604704	90.831	ng	96
94) 1,2,4-Trichlorobenzene	22.18	180	3540156	131.102	ng	99
95) Naphthalene	22.29	128	8520559	108.152	ng	99
96) n-Dodecane	22.28	57	2314542	91.949	ng	94
97) Hexachlorobutadiene	22.60	225	2161108	129.883	ng	100
98) Cyclohexanone	18.36	55	2063392	106.236	ng	99
99) tert-Butylbenzene	20.18	119	5293493	98.548	ng	99
100) n-Butylbenzene	20.93	91	5900645	104.919	ng	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241421.D
Acq On : 24 Nov 2014 21:29 Operator: LH
Sample : 100ng TO-15 ICAL STD
Misc : S29-11141401/S29-11201403 (12/19)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 07:07:53 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 07:07:14 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241433.D
Acq On : 25 Nov 2014 9:04 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-11141401/S29-11241401 (12/23)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 09:50:36 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 11/25/14

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.21	130	174673	12.500	ng	0.02
37) 1,4-Difluorobenzene (IS2)	13.34	114	764832	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	281054	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	12.07	65	185924	12.307	ng	0.02
Spiked Amount 12.500			Recovery =	98.48%		
57) Toluene-d8 (SS2)	15.79	98	699923	12.687	ng	0.00
Spiked Amount 12.500			Recovery =	101.52%		
73) Bromofluorobenzene (SS3)	19.04	174	332424	12.348	ng	0.00
Spiked Amount 12.500			Recovery =	98.80%		
Target Compounds						Qvalue
2) Propene	4.10	42	368463	23.552	ng	100
3) Dichlorodifluoromethan...	4.26	85	820636	23.871	ng	100
4) Chloromethane	4.54	50	563488	24.278	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	4.81	135	523058	24.988	ng	99
6) Vinyl Chloride	4.97	62	632676	26.775	ng	100
7) 1,3-Butadiene	5.24	54	417818	29.028	ng	100
8) Bromomethane	5.68	94	481110	27.318	ng	100
9) Chloroethane	6.01	64	354189	27.564	ng	99
10) Ethanol	6.39	45	1367281	126.086	ng	99
11) Acetonitrile	6.64	41	710516	26.248	ng	100
12) Acrolein	6.83	56	284340	29.816	ng	99
13) Acetone	7.04	58	1528816	130.565	ng	99
14) Trichlorofluoromethane	7.28	101	741525	29.551	ng	100
15) 2-Propanol (Isopropanol)	7.54	45	1899138	51.333	ng	100
16) Acrylonitrile	7.80	53	576924	27.838	ng	99
17) 1,1-Dichloroethene	8.25	96	478385	27.523	ng	99
18) 2-Methyl-2-Propanol (t...	8.42	59	1909579	50.295	ng	100
19) Methylene Chloride	8.48	84	488366	26.877	ng	99
20) 3-Chloro-1-propene (Al...	8.64	41	518428	30.839	ng	98
21) Trichlorotrifluoroethane	8.89	151	423221	26.399	ng	99
22) Carbon Disulfide	8.74	76	1784136	27.466	ng	100
23) trans-1,2-Dichloroethene	9.76	61	596054	28.498	ng	99
24) 1,1-Dichloroethane	10.01	63	708896	26.374	ng	100
25) Methyl tert-Butyl Ether	10.11	73	1213876	27.685	ng	100
26) Vinyl Acetate	10.27	86	546865	137.712	ng	97
27) 2-Butanone (MEK)	10.51	72	295610	26.283	ng	100
28) cis-1,2-Dichloroethene	11.03	61	556778	28.006	ng	99
29) Diisopropyl Ether	11.33	87	430130	27.584	ng	99
30) Ethyl Acetate	11.34	61	293871	51.504	ng	99
31) n-Hexane	11.32	57	525466	23.497	ng	99
32) Chloroform	11.38	83	736817	27.483	ng	100
34) Tetrahydrofuran (THF)	11.78	72	280504	24.449	ng	100
35) Ethyl tert-Butyl Ether	11.92	87	527049	27.958	ng	100
36) 1,2-Dichloroethane	12.18	62	434610	26.701	ng	100
38) 1,1,1-Trichloroethane	12.46	97	619730	27.881	ng	100
39) Isopropyl Acetate	12.89	61	535397	59.710	ng	98
40) 1-Butanol	12.91	56	835410	56.052	ng	100
41) Benzene	12.94	78	1678659	27.055	ng	100
42) Carbon Tetrachloride	13.10	117	571659	30.873	ng	99
43) Cyclohexane	13.23	84	1344358	56.157	ng	99
44) tert-Amyl Methyl Ether	13.58	73	1216233	28.451	ng	100
45) 1,2-Dichloropropane	13.79	63	411660	27.879	ng	100

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241433.D
Acq On : 25 Nov 2014 9:04 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-11141401/S29-11241401 (12/23)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 09:50:36 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

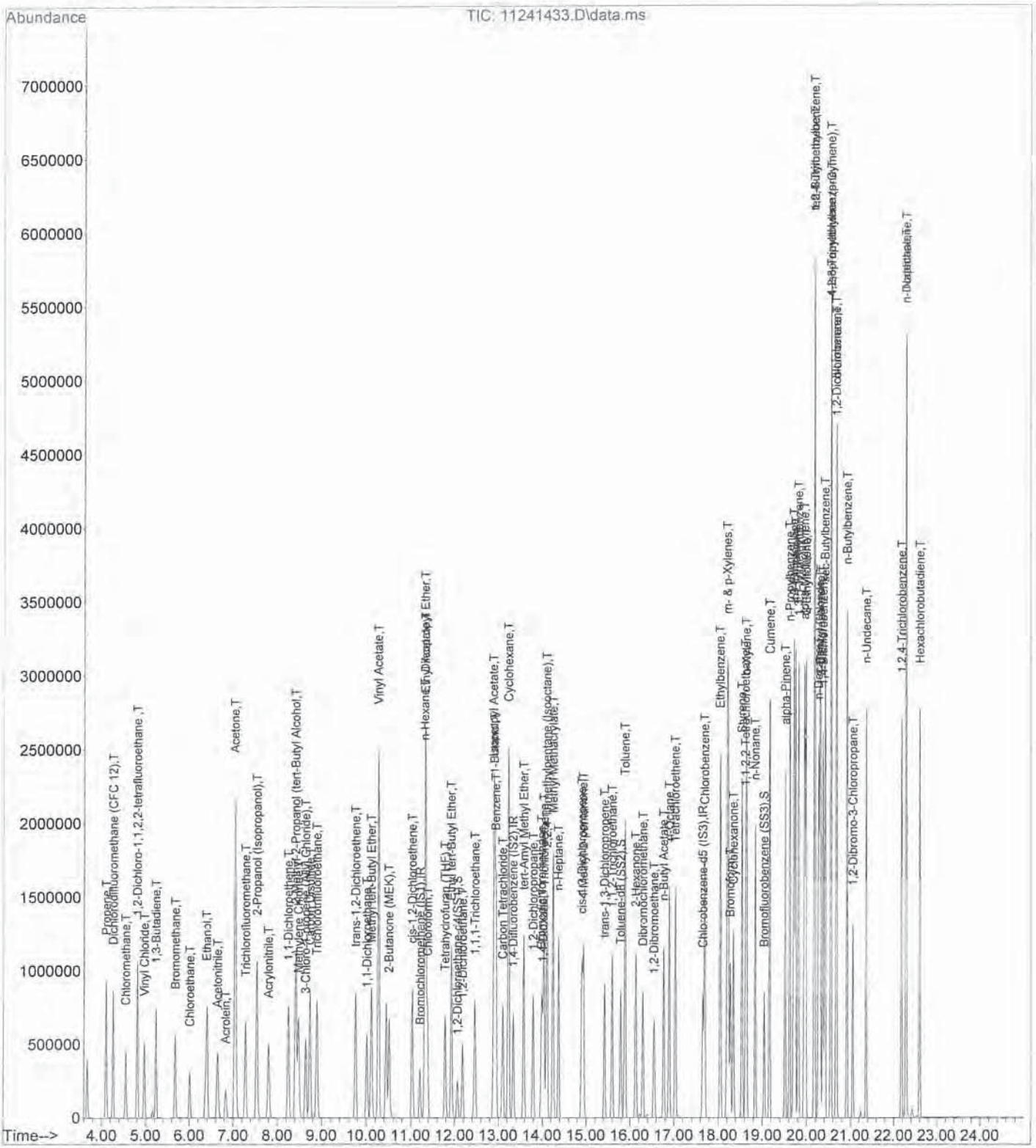
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
46) Bromodichloromethane	13.99	83	602724	30.409	ng	100
47) Trichloroethene	14.04	130	539066	28.016	ng	99
48) 1,4-Dioxane	14.01	88	396202	26.819	ng	100
49) 2,2,4-Trimethylpentane...	14.11	57	1658475	27.071	ng	99
50) Methyl Methacrylate	14.25	100	408867	61.106	ng	99
51) n-Heptane	14.37	71	379988	27.308	ng	99
52) cis-1,3-Dichloropropene	14.90	75	767500	33.691	ng	100
53) 4-Methyl-2-pentanone	14.94	58	399380	29.678	ng	100
54) trans-1,3-Dichloropropene	15.42	75	646122	33.489	ng	100
55) 1,1,2-Trichloroethane	15.60	97	476366	28.732	ng	100
58) Toluene	15.89	91	1857857	25.892	ng	100
59) 2-Hexanone	16.13	43	824275	27.915	ng	100
60) Dibromochloromethane	16.30	129	602093	30.298	ng	100
61) 1,2-Dibromoethane	16.55	107	574865	29.798	ng	100
62) n-Butyl Acetate	16.77	43	940649	28.243	ng	100
63) n-Octane	16.89	57	332569	27.961	ng	100
64) Tetrachloroethene	17.03	166	649915	25.701	ng	100
65) Chlorobenzene	17.70	112	1334411	27.441	ng	99
66) Ethylbenzene	18.05	91	2077291	28.154	ng	100
67) m- & p-Xylenes	18.21	91	3123248	53.490	ng	99
68) Bromoform	18.27	173	606942	32.903	ng	99
69) Styrene	18.54	104	1402432	28.856	ng	100
70) o-Xylene	18.64	91	1583924	26.321	ng	100
71) n-Nonane	18.84	43	673341	26.165	ng	100
72) 1,1,2,2-Tetrachloroethane	18.62	83	872344	27.596	ng	100
74) Cumene	19.17	105	2134895	25.814	ng	100
75) alpha-Pinene	19.52	93	1053947	28.086	ng	100
76) n-Propylbenzene	19.62	91	2559008	26.054	ng	100
77) 3-Ethyltoluene	19.71	105	2154103	26.520	ng	100
78) 4-Ethyltoluene	19.75	105	2153947	27.733	ng	100
79) 1,3,5-Trimethylbenzene	19.81	105	1771749	26.653	ng	100
80) alpha-Methylstyrene	19.95	118	1087588	29.987	ng	100
81) 2-Ethyltoluene	19.99	105	2106522	27.129	ng	100
82) 1,2,4-Trimethylbenzene	20.18	105	1761720	26.888	ng	100
83) n-Decane	20.27	57	834159	26.532	ng	100
84) Benzyl Chloride	20.29	91	1661557	32.792	ng	100
85) 1,3-Dichlorobenzene	20.31	146	1251666	27.395	ng	100
86) 1,4-Dichlorobenzene	20.37	146	1252186	25.005	ng	100
87) sec-Butylbenzene	20.41	105	2422745	27.189	ng	99
88) 4-Isopropyltoluene (p-...	20.55	119	2173153	25.364	ng	100
89) 1,2,3-Trimethylbenzene	20.55	105	1803621	25.555	ng	99
90) 1,2-Dichlorobenzene	20.67	146	1181212	26.603	ng	100
91) d-Limonene	20.68	68	633620	29.618	ng	100
92) 1,2-Dibromo-3-Chloropr...	21.06	157	484132	30.766	ng	100
93) n-Undecane	21.37	57	895435	26.688	ng	100
94) 1,2,4-Trichlorobenzene	22.18	180	1017754	29.599	ng	100
95) Naphthalene	22.28	128	2881610	29.459	ng	100
96) n-Dodecane	22.28	57	891099	29.492	ng	100
97) Hexachlorobutadiene	22.60	225	622415	28.316	ng	100
98) Cyclohexanone	18.35	55	601450	30.610	ng	100
99) tert-Butylbenzene	20.18	119	1766951	26.873	ng	99
100) n-Butylbenzene	20.92	91	1882417	26.734	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\24\11241433.D
Acq On : 25 Nov 2014 9:04 Operator: LH
Sample : 25ng TO-15 ICV STD
Misc : S29-11141401/S29-11241401 (12/23)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 25 09:50:36 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



INITIAL CALIBRATION VERIFICATION CHECK SHEET

Data File Name: **11241433.D**
Data File Path: **I:\MS16\DATA\2014_11\24**
Operator: **LH**
Date Acquired: **11/25/14** **9:04**

Acq. Method File: **TO15.M**
Sample Name: **25ng TO-15 ICV STD**
Misc Info: **S29-11141401/S29-11241401 (**
Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail
2)	Propene	4.10	23.6	25.00	94	70	130	*
3)	Dichlorodifluoromethane (CFC 1	4.26	23.9	25.50	94	70	130	*
4)	Chloromethane	4.54	24.3	24.75	98	70	130	*
5)	1,2-Dichloro-1,1,2,2-tetrafluoroetl	4.81	25.0	25.75	97	70	130	*
6)	Vinyl Chloride	4.97	26.8	25.25	106	70	130	*
7)	1,3-Butadiene	5.24	29.0	26.75	108	70	130	*
8)	Bromomethane	5.68	27.3	25.25	108	70	130	*
9)	Chloroethane	6.01	27.6	25.25	109	70	130	*
10)	Ethanol	6.39	126	127.25	99	70	130	*
11)	Acetonitrile	6.64	26.2	25.50	103	70	130	*
12)	Acrolein	6.83	29.8	26.75	111	70	130	*
13)	Acetone	7.04	131	135.00	97	70	130	*
14)	Trichlorofluoromethane	7.28	29.6	24.75	120	70	130	*
15)	2-Propanol (Isopropanol)	7.54	51.3	52.50	98	70	130	*
16)	Acrylonitrile	7.80	27.8	26.00	107	70	130	*
17)	1,1-Dichloroethene	8.25	27.5	26.75	103	70	130	*
18)	2-Methyl-2-Propanol (tert-Butyl Alc	8.42	50.3	52.75	95	70	130	*
19)	Methylene Chloride	8.48	26.9	27.00	100	70	130	*
20)	3-Chloro-1-propene (Allyl Chlorid	8.64	30.8	27.25	113	70	130	*
21)	Trichlorotrifluoroethane	8.89	26.4	27.00	98	70	130	*
22)	Carbon Disulfide	8.74	27.5	24.50	112	70	130	*
23)	trans-1,2-Dichloroethene	9.76	28.5	26.50	108	70	130	*
24)	1,1-Dichloroethane	10.01	26.4	26.00	102	70	130	*
25)	Methyl tert-Butyl Ether	10.11	27.7	26.50	105	70	130	*
26)	Vinyl Acetate	10.27	138	128.00	108	70	130	*
27)	2-Butanone (MEK)	10.51	26.3	27.00	97	70	130	*
28)	cis-1,2-Dichloroethene	11.03	28.0	26.75	105	70	130	*
29)	Diisopropyl Ether	11.33	27.6	27.25	101	70	130	*
30)	Ethyl Acetate	11.34	51.5	53.50	96	70	130	*
31)	n-Hexane	11.32	23.5	26.25	90	70	130	*
32)	Chloroform	11.38	27.5	27.00	102	70	130	*
34)	Tetrahydrofuran (THF)	11.78	24.4	25.75	95	70	130	*
35)	Ethyl tert-Butyl Ether	11.92	28.0	26.50	106	70	130	*
36)	1,2-Dichloroethane	12.18	26.7	26.25	102	70	130	*
38)	1,1,1-Trichloroethane	12.46	27.9	26.00	107	70	130	*
39)	Isopropyl Acetate	12.89	59.7	54.50	110	70	130	*
40)	1-Butanol	12.91	56.1	55.75	101	70	130	*
41)	Benzene	12.94	27.1	27.50	99	70	130	*
42)	Carbon Tetrachloride	13.10	30.9	26.75	116	70	130	*
43)	Cyclohexane	13.23	56.2	52.75	107	70	130	*
44)	tert-Amyl Methyl Ether	13.58	28.5	26.25	109	70	130	*
45)	1,2-Dichloropropane	13.79	27.9	26.50	105	70	130	*
46)	Bromodichloromethane	13.99	30.4	27.00	113	70	130	*
47)	Trichloroethene	14.04	28.0	26.00	108	70	130	*
48)	1,4-Dioxane	14.01	26.8	27.25	98	70	130	*
49)	2,2,4-Trimethylpentane (Isooctane)	14.11	27.1	26.00	104	70	130	*

VH 11/25/14

I:\MS16\0-Instrument Info\0-Security Certificates\ICV_09041405.CRT

INITIAL CALIBRATION VERIFICATION CHECK SHEET

Data File Name: **11241433.D** Acq. Method File: **TO15.M**
Data File Path: **I:\MS16\DATA\2014_11\24** Sample Name: **25ng TO-15 ICV STD**
Operator: **LH** Misc Info: **S29-11141401/S29-11241401 (**
Date Acquired: **11/25/14** **9:04** Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail
50)	**Methyl Methacrylate**	**14.25**	**61.1**	**52.50**	116	**70**	**130**	*
51)	**n-Heptane**	**14.37**	**27.3**	**26.75**	102	**70**	**130**	*
52)	**cis-1,3-Dichloropropene**	**14.90**	**33.7**	**28.25**	119	**70**	**130**	*
53)	**4-Methyl-2-pentanone**	**14.94**	**29.7**	**27.25**	109	**70**	**130**	*
54)	**trans-1,3-Dichloropropene**	**15.42**	**33.5**	**27.00**	124	**70**	**130**	*
55)	**1,1,2-Trichloroethane**	**15.60**	**28.7**	**26.50**	108	**70**	**130**	*
58)	**Toluene**	**15.89**	**25.9**	**26.50**	98	**70**	**130**	*
59)	**2-Hexanone**	**16.13**	**27.9**	**27.75**	101	**70**	**130**	*
60)	**Dibromochloromethane**	**16.30**	**30.3**	**27.50**	110	**70**	**130**	*
61)	**1,2-Dibromoethane**	**16.55**	**29.8**	**27.00**	110	**70**	**130**	*
62)	**n-Butyl Acetate**	**16.77**	**28.2**	**28.00**	101	**70**	**130**	*
63)	**n-Octane**	**16.89**	**28.0**	**26.00**	108	**70**	**130**	*
64)	**Tetrachloroethene**	**17.03**	**25.7**	**24.75**	104	**70**	**130**	*
65)	**Chlorobenzene**	**17.70**	**27.4**	**27.00**	101	**70**	**130**	*
66)	**Ethylbenzene**	**18.05**	**28.2**	**26.50**	106	**70**	**130**	*
67)	**m- & p-Xylenes**	**18.21**	**53.5**	**52.50**	102	**70**	**130**	*
68)	**Bromoform**	**18.27**	**32.9**	**27.00**	122	**70**	**130**	*
69)	**Styrene**	**18.54**	**28.9**	**27.25**	106	**70**	**130**	*
70)	**o-Xylene**	**18.64**	**26.3**	**25.75**	102	**70**	**130**	*
71)	**n-Nonane**	**18.84**	**26.2**	**25.50**	103	**70**	**130**	*
72)	**1,1,2,2-Tetrachloroethane**	**18.62**	**27.6**	**25.25**	109	**70**	**130**	*
74)	**Cumene**	**19.17**	**25.8**	**25.50**	101	**70**	**130**	*
75)	**alpha-Pinene**	**19.52**	**28.1**	**26.00**	108	**70**	**130**	*
76)	**n-Propylbenzene**	**19.62**	**26.1**	**25.25**	103	**70**	**130**	*
77)	3-Ethyltoluene	19.71	26.5	26.50	100	**70**	**130**	*
78)	**4-Ethyltoluene**	**19.75**	**27.7**	**26.50**	**105**	**70**	**130**	*
79)	**1,3,5-Trimethylbenzene**	**19.81**	**26.7**	**26.50**	**101**	**70**	**130**	*
80)	alpha-Methylstyrene	19.95	30.0	26.00	**115**	**70**	**130**	*
81)	2-Ethyltoluene	19.99	27.1	26.25	**103**	**70**	**130**	*
82)	**1,2,4-Trimethylbenzene**	**20.18**	**26.9**	**26.25**	**102**	**70**	**130**	*
83)	n-Decane	20.27	26.5	25.75	**103**	**70**	**130**	*
84)	**Benzyl Chloride**	**20.29**	**32.8**	**27.25**	**120**	**70**	**130**	*
85)	**1,3-Dichlorobenzene**	**20.31**	**27.4**	**27.25**	**101**	**70**	**130**	*
86)	**1,4-Dichlorobenzene**	**20.37**	**25.0**	**26.50**	**94**	**70**	**130**	*
87)	sec-Butylbenzene	20.41	27.2	26.75	**102**	**70**	**130**	*
88)	4-Isopropyltoluene (p-Cymene)	20.55	25.4	25.25	**101**	**70**	**130**	*
89)	1,2,3-Trimethylbenzene	20.55	25.6	26.25	**98**	**70**	**130**	*
90)	**1,2-Dichlorobenzene**	**20.67**	**26.6**	**26.75**	**99**	**70**	**130**	*
91)	**d-Limonene**	**20.68**	**29.6**	**26.25**	**113**	**70**	**130**	*
92)	**1,2-Dibromo-3-Chloropropane**	**21.06**	**30.8**	**25.75**	**120**	**70**	**130**	*
93)	n-Undecane	21.37	26.7	25.25	**106**	**70**	**130**	*
94)	**1,2,4-Trichlorobenzene**	**22.18**	**29.6**	**26.25**	**113**	**70**	**130**	*
95)	**Naphthalene**	**22.28**	**29.5**	**24.50**	**120**	**70**	**130**	*
96)	n-Dodecane	22.28	29.5	25.25	**117**	**70**	**130**	*
97)	**Hexachlorobutadiene**	**22.60**	**28.3**	**26.75**	**106**	**70**	**130**	*
98)	Cyclohexanone	18.35	30.6	27.75	110	**70**	**130**	*
99)	tert-Butylbenzene	20.18	26.9	26.50	102	**70**	**130**	*
100)	n-Butylbenzene	20.92	26.7	27.25	98	**70**	**130**	*

Bold = 75 Compound List
*** = Pass**

VH 11/25/14

I:\MS16\0-Instrument Info\0-Security Certificates\ICV_09041405.CRT

Response Factor Report GCMS-16

Method Path : I:\MS16\METHODS\
Method File : ACF16110414.M
Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
Last Update : Wed Nov 05 09:18:53 2014
Response Via : Initial Calibration

Calibration Files
0.40=11041422.D 1.0 =11041423.D 2.5 =11041424.D 5.0 =11041425.D 25 =11041426.D 50 =11041427.D
100 =11041428.D

		Compound	0.40	1.0	2.5	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------ISTD----------								
2)	T	Chloropentaflu...	2.294	1.807	1.645	1.519	1.464	1.371	1.317	1.631	20.60
3)	T	1,1,1,2-Tetraf...	1.499	1.121	0.971	0.869	0.939	0.852	0.774	1.004	24.34
4)	T	1,1-Difluoroet...	1.737	1.326	1.179	1.052	1.133	1.013	0.884	1.189	23.41
5)	T	Chlorodifluoro...	0.394	0.302	0.274	0.254	0.257	0.244	0.234	0.280	19.64
6)	T	1-Chloro-1,1-D...	2.714	1.896	1.654	1.554	1.540	1.516	1.511	1.769	24.77
7)	T	Dichlorofluoro...	3.929	2.944	2.611	2.322	2.396	2.252	2.297	2.679	22.46
8)	T	Vinylbromide	1.775	1.367	1.260	1.152	1.210	1.149	1.189	1.300	17.11
9)	T	2,2-Dichloro-1...	2.847	2.055	1.889	1.709	1.647	1.611	1.616	1.911	23.27
10)	T	2-Methylbutane	1.885	1.345	1.190	1.034	1.044	0.969	0.949	1.202	27.56
11)	T	Methyl Acetate	3.565	2.794	2.489	2.342	2.412	2.274	2.207	2.583	18.31
12)	T	2-Methylpentane	1.841	1.345	1.181	1.070	1.067	1.052	1.025	1.226	23.89
13)	T	2,2-Dichloropr...	2.386	1.749	1.669	1.525	1.615	1.535	1.423	1.700	18.84
14)	T	1,1-Dichloropr...	2.444	1.858	1.640	1.498	1.607	1.556	1.520	1.732	19.40
15)	T	Thiophene	4.523	3.342	2.929	2.720	2.854	2.690	2.530	3.084	22.18
16)	IR	1,4-Difluorobenzen...	----------ISTD----------								
17)	T	2,3-Dimethylpe...	0.660	0.529	0.451	0.418	0.444	0.409	0.372	0.469	20.77
18)	T	Dibromomethane	0.364	0.289	0.262	0.236	0.262	0.260	0.243	0.274	15.80
19)	IR	Chlorobenzene-d5 (...	----------ISTD----------								
20)	T	Methyl Cyclohe...	1.422	1.063	0.934	0.878	0.885	0.812	0.633	0.947	26.06
21)	T	1,3-Dichloropr...	1.602	1.230	1.121	1.042	1.059	0.974	0.850	1.125	21.42
22)	T	1,1,1,2-Tetrac...	1.052	0.822	0.747	0.702	0.724	0.670	0.590	0.758	19.50
23)	T	1-Chlorohexane	1.609	1.259	1.136	1.052	1.074	0.986	0.854	1.138	21.25
24)	T	1,2,3-Trichlor...	1.582	1.205	1.068	1.011	1.013	0.930	0.789	1.085	23.32
25)	T	Bromobenzene	1.806	1.402	1.283	1.188	1.192	1.087	0.914	1.267	22.27
26)	T	2-Chlorotoluene	3.412	2.566	2.282	2.137	2.124	1.931	1.584	2.291	25.30
27)	T	4-Chlorotoluene	3.553	2.724	2.420	2.267	2.211	1.980	1.627	2.398	25.60
28)	T	Indan	4.487	3.417	3.083	2.887	2.879	2.562	2.044	3.051	25.06
29)	T	Indene	3.930	3.069	2.840	2.683	2.669	2.410	1.937	2.791	22.07
30)	T	1,2,4,5-Tetram...	4.634	3.632	3.328	3.146	3.021	2.838	2.194	3.256	23.18
31)	T	1,2,3,4-Tetram...	4.740	3.637	3.289	3.083	3.013	2.533	2.049	3.192	26.79
32)	T	1,2,3,5-Tetram...	4.714	3.562	3.239	3.086	2.979	2.668	2.126	3.196	25.30
33)	T	1,2,3-Trichlor...	2.204	1.753	1.565	1.504	1.486	1.405	1.179	1.585	20.36

(#) = Out of Range

11/5/14

TO-15 CUSTOM COMPOUND LIST
ICAL CONCENTRATIONS

Std#:	Working Standards	
(1)	200 ng/L Working Std. ID:	S29-11041403
(2)	20 ng/L Working Std. ID:	S29-11041406

Injection Amts.(L):	0.020	0.025	0.050	0.125	0.250	0.125	0.250	0.500
Standards Used:	(2)	(2)	(2)	(2)	(2)	(1)	(1)	(1)
Compounds/ Concentrations (ng):	0.4ng	0.5ng	1.0ng	2.5ng	5.0ng	25ng	50ng	100ng
Vinylbromide	0.404	0.505	1.010	2.525	5.05	25.25	50.5	101
2-Methylbutane (Isopentane)	0.404	0.505	1.010	2.525	5.05	25.25	50.5	101
2-Methylpentane	0.396	0.495	0.990	2.475	4.95	24.75	49.5	99
2,2-Dichloropropane	0.408	0.510	1.020	2.550	5.10	25.50	51.0	102
1,1-Dichloropropene	0.412	0.515	1.030	2.575	5.15	25.75	51.5	103
Thiophene	0.404	0.505	1.010	2.525	5.05	25.25	50.5	101
2,3-Dimethylpentane	0.412	0.515	1.030	2.575	5.15	25.75	51.5	103
Dibromomethane	0.432	0.540	1.080	2.700	5.40	27.00	54.0	108
1,3-Dichloropropane	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
1,1,1,2-Tetrachloroethane	0.424	0.530	1.060	2.650	5.30	26.50	53.0	106
1-Chlorohexane	0.408	0.510	1.020	2.550	5.10	25.50	51.0	102
1,2,3-Trichloropropane	0.424	0.530	1.060	2.650	5.30	26.50	53.0	106
Bromobenzene	0.428	0.535	1.070	2.675	5.35	26.75	53.5	107
2-Chlorotoluene	0.436	0.545	1.090	2.725	5.45	27.25	54.5	109
4-Chlorotoluene	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
Indane	0.408	0.510	1.020	2.550	5.10	25.50	51.0	102
Indene	0.396	0.495	0.990	2.475	4.95	24.75	49.5	99
1,2,4,5-Tetramethylbenzene	0.400	0.500	1.000	2.500	5.00	25.00	50.0	100
1,2,3,4-Tetramethylbenzene	0.396	0.495	0.990	2.475	4.95	24.75	49.5	99
1,2,3,5-Tetramethylbenzene	0.392	0.490	0.980	2.450	4.90	24.50	49.0	98
1,2,3-Trichlorobenzene	0.392	0.490	0.980	2.450	4.90	24.50	49.0	98
Chloropentafluoroethane (R115)	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
2,2-Dichloro-1,1,1-trifluoroethane (R123)	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
1,1-Difluoroethane (R152a)	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
Chlorodifluoromethane (R22)	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
Dichlorofluoromethane (R21)	0.400	0.500	1.000	2.500	5.00	25.00	50.0	100
1,1,1,2-Tetrafluoroethane (R134a)	0.408	0.510	1.020	2.550	5.10	25.50	51.0	102
1-Chloro-1,1-Difluoroethane	0.408	0.510	1.020	2.550	5.10	25.50	51.0	102
Methyl Acetate	0.412	0.515	1.030	2.575	5.15	25.75	51.5	103
Methylcyclohexane	0.428	0.535	1.070	2.675	5.35	26.75	53.5	107
Chlorotrifluoroethene	0.416	0.520	1.040	2.600	5.20	26.00	52.0	104

LH 11/5/14

Calibration Status Report GCMS-16

Method : I:\MS16\METHODS\ACF16110414.M (RTE Integrator)
Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
Last Update : Wed Nov 05 09:18:53 2014
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.40	0	13	I:\MS16\DATA\2014_11\04\11041422.D
2	1.0	1	13	I:\MS16\DATA\2014_11\04\11041423.D
3	2.5	3	13	I:\MS16\DATA\2014_11\04\11041424.D
4	5.0	5	13	I:\MS16\DATA\2014_11\04\11041425.D
5	25	26	13	I:\MS16\DATA\2014_11\04\11041426.D
6	50	53	13	I:\MS16\DATA\2014_11\04\11041427.D
7	100	105	13	I:\MS16\DATA\2014_11\04\11041428.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.40	Nov 05 09:18 2014	Nov 05 09:13 2014	5 Nov 2014 1:45
2	1.0	Nov 05 09:18 2014	Nov 05 09:13 2014	5 Nov 2014 2:19
3	2.5	Nov 05 09:18 2014	Nov 05 09:13 2014	5 Nov 2014 2:53
4	5.0	Nov 05 09:18 2014	Nov 05 09:13 2014	5 Nov 2014 3:28
5	25	Nov 05 09:18 2014	Nov 05 09:13 2014	5 Nov 2014 4:02
6	50	Nov 05 09:18 2014	Nov 05 09:13 2014	5 Nov 2014 4:36
7	100	Nov 05 09:18 2014	Nov 05 09:13 2014	5 Nov 2014 5:10

ACF16110414.M Wed Nov 05 09:21:53 2014

11/5/14

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041422.D
Acq On : 5 Nov 2014 1:45 Operator: LH
Sample : 0.4ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041406 (12/3)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 05 09:13:30 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	202123	12.500	ng	-0.01
16) 1,4-Difluorobenzene (IS2)	13.33	114	972989	12.500	ng	-0.01
19) Chlorobenzene-d5 (IS3)	17.65	82	351054	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.81	85	15580	0.491	ng	99
3) 1,1,1,2-Tetrafluoroeth...	3.91	83	9887	0.438	ng	99
4) 1,1-Difluoroethane	4.02	65	11799	0.506	ng	98
5) Chlorodifluoromethane ...	4.12	67	2678	0.375	ng	83
6) 1-Chloro-1,1-Difluoroe...	4.57	65	17907	0.405	ng	98
7) Dichlorofluoromethane ...	6.26	67	25410	0.464	ng	100
8) Vinylbromide	6.60	108	11597	0.534	ng	97
9) 2,2-Dichloro-1,1,1-tri...	6.99	83	19338	0.547	ng	98
10) 2-Methylbutane	7.08	57	12312	0.481	ng	90
11) Methyl Acetate	8.49	43	23753	0.426	ng	98
12) 2-Methylpentane	10.26	71	11790	0.487	ng	96
13) 2,2-Dichloropropane	11.39	77	15742	0.426	ng	99
14) 1,1-Dichloropropene	12.79	75	16282	0.467	ng	99
15) Thiophene	13.06	84	29544	0.534	ng	99
17) 2,3-Dimethylpentane	13.51	56	21180	0.466	ng	100
18) Dibromomethane	13.75	174	12249	0.677	ng	99
20) Methyl Cyclohexane	15.01	55	17098	0.596	ng	99
21) 1,3-Dichloropropane	15.90	76	18897	0.619	ng	99
22) 1,1,1,2-Tetrachloroethane	17.68	131	12530	0.679	ng	99
23) 1-Chlorohexane	17.87	91	18431	0.633	ng	96
24) 1,2,3-Trichloropropane	18.74	75	18841	0.619	ng	99
25) Bromobenzene	19.25	77	21709	0.603	ng	98
26) 2-Chlorotoluene	19.59	91	41784	0.682	ng	99
27) 4-Chlorotoluene	19.65	91	41905	0.647	ng	99
28) Indan	20.73	117	51410	0.714	ng	100
29) Indene	20.81	115	43711	0.700	ng	100
30) 1,2,4,5-Tetramethylben...	21.57	119	52061	0.664	ng	99
31) 1,2,3,4-Tetramethylben...	21.61	119	52715	0.691	ng	100
32) 1,2,3,5-Tetramethylben...	21.95	119	51894	0.685	ng	97
33) 1,2,3-Trichlorobenzene	22.53	180	24263	0.772	ng	98

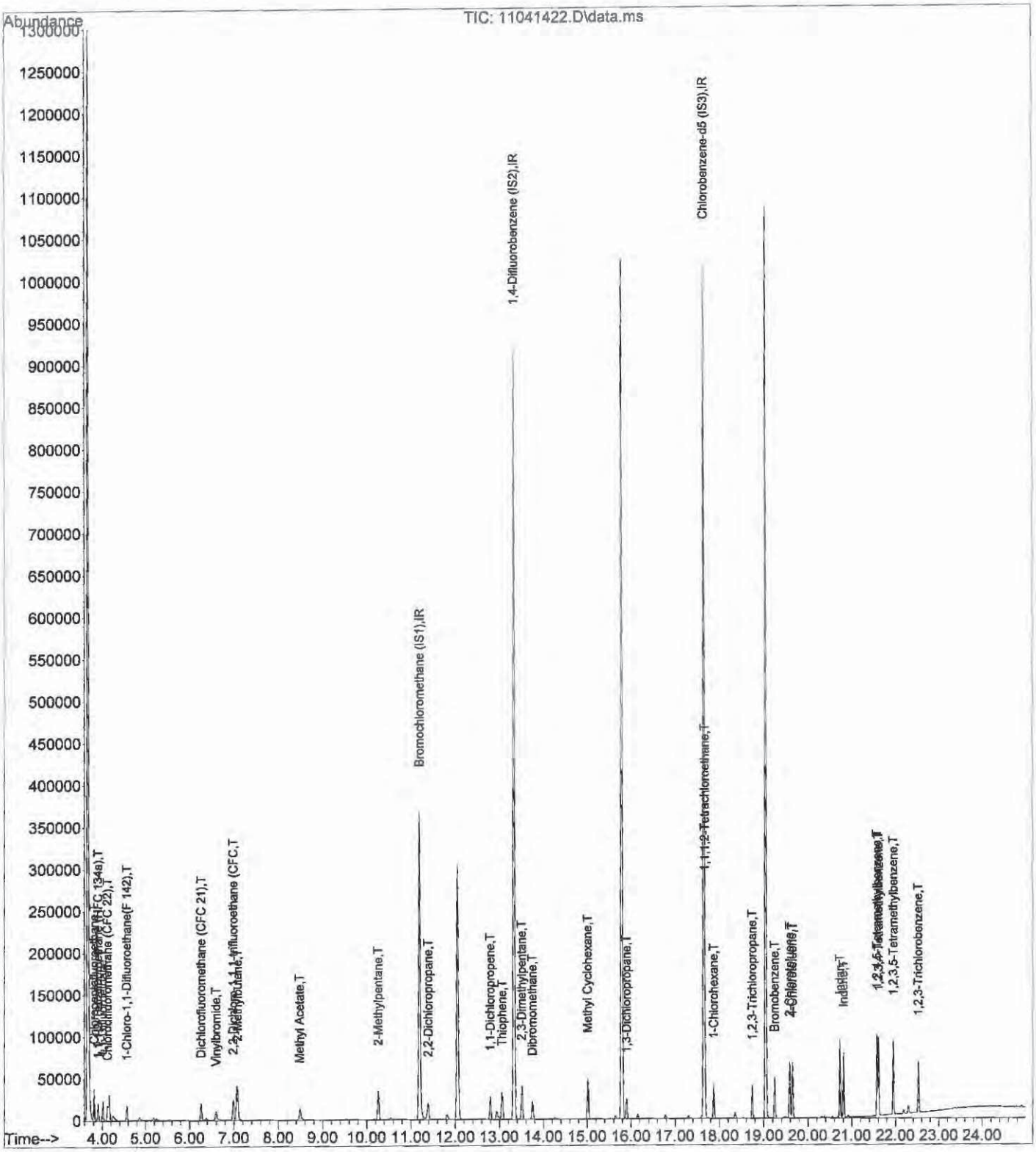
(#) = qualifier out of range (m) = manual integration (+) = signals summed

11/5/14

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041422.D
Acq On : 5 Nov 2014 1:45 Operator: LH
Sample : 0.4ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041406 (12/3)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 05 09:13:30 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041423.D
Acq On : 5 Nov 2014 2:19 Operator: LH
Sample : 1.0ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041406 (12/3)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 05 09:13:31 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	200344	12.500	ng	-0.01
16) 1,4-Difluorobenzene (IS2)	13.33	114	930366	12.500	ng	-0.01
19) Chlorobenzene-d5 (IS3)	17.65	82	358227	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.81	85	30408	0.967	ng	99
3) 1,1,1,2-Tetrafluoroeth...	3.90	83	18324	0.818	ng	97
4) 1,1-Difluoroethane	4.00	65	22321	0.966	ng	99
5) Chlorodifluoromethane ...	4.11	67	5077	0.717	ng	89
6) 1-Chloro-1,1-Difluoroe...	4.57	65	31004	0.707	ng	99
7) Dichlorofluoromethane ...	6.26	67	47187	0.870	ng	99
8) Vinylbromide	6.59	108	22133	1.028	ng	100
9) 2,2-Dichloro-1,1,1-tri...	6.98	83	34585	0.986	ng	100
10) 2-Methylbutane	7.07	57	21767	0.859	ng	97
11) Methyl Acetate	8.49	43	46120	0.834	ng	98
12) 2-Methylpentane	10.26	71	21340	0.889	ng	97
13) 2,2-Dichloropropane	11.39	77	28589	0.781	ng	98
14) 1,1-Dichloropropene	12.79	75	30670	0.887	ng	99
15) Thiophene	13.06	84	54097	0.987	ng	99
17) 2,3-Dimethylpentane	13.51	56	40587	0.933	ng	99
18) Dibromomethane	13.75	174	23265	1.345	ng	100
20) Methyl Cyclohexane	15.01	55	32604	1.113	ng	97
21) 1,3-Dichloropropane	15.90	76	37026	1.188	ng	100
22) 1,1,1,2-Tetrachloroethane	17.68	131	24959	1.325	ng	99
23) 1-Chlorohexane	17.87	91	36791	1.237	ng	99
24) 1,2,3-Trichloropropane	18.74	75	36600	1.178	ng	99
25) Bromobenzene	19.24	77	42977	1.170	ng	100
26) 2-Chlorotoluene	19.59	91	80159	1.282	ng	98
27) 4-Chlorotoluene	19.65	91	81976	1.241	ng	99
28) Indan	20.73	117	99890	1.359	ng	99
29) Indene	20.81	115	87064	1.366	ng	100
30) 1,2,4,5-Tetramethylben...	21.57	119	104100	1.302	ng	100
31) 1,2,3,4-Tetramethylben...	21.61	119	103175	1.326	ng	99
32) 1,2,3,5-Tetramethylben...	21.95	119	100035	1.294	ng	100
33) 1,2,3-Trichlorobenzene	22.53	180	49230	1.535	ng	99

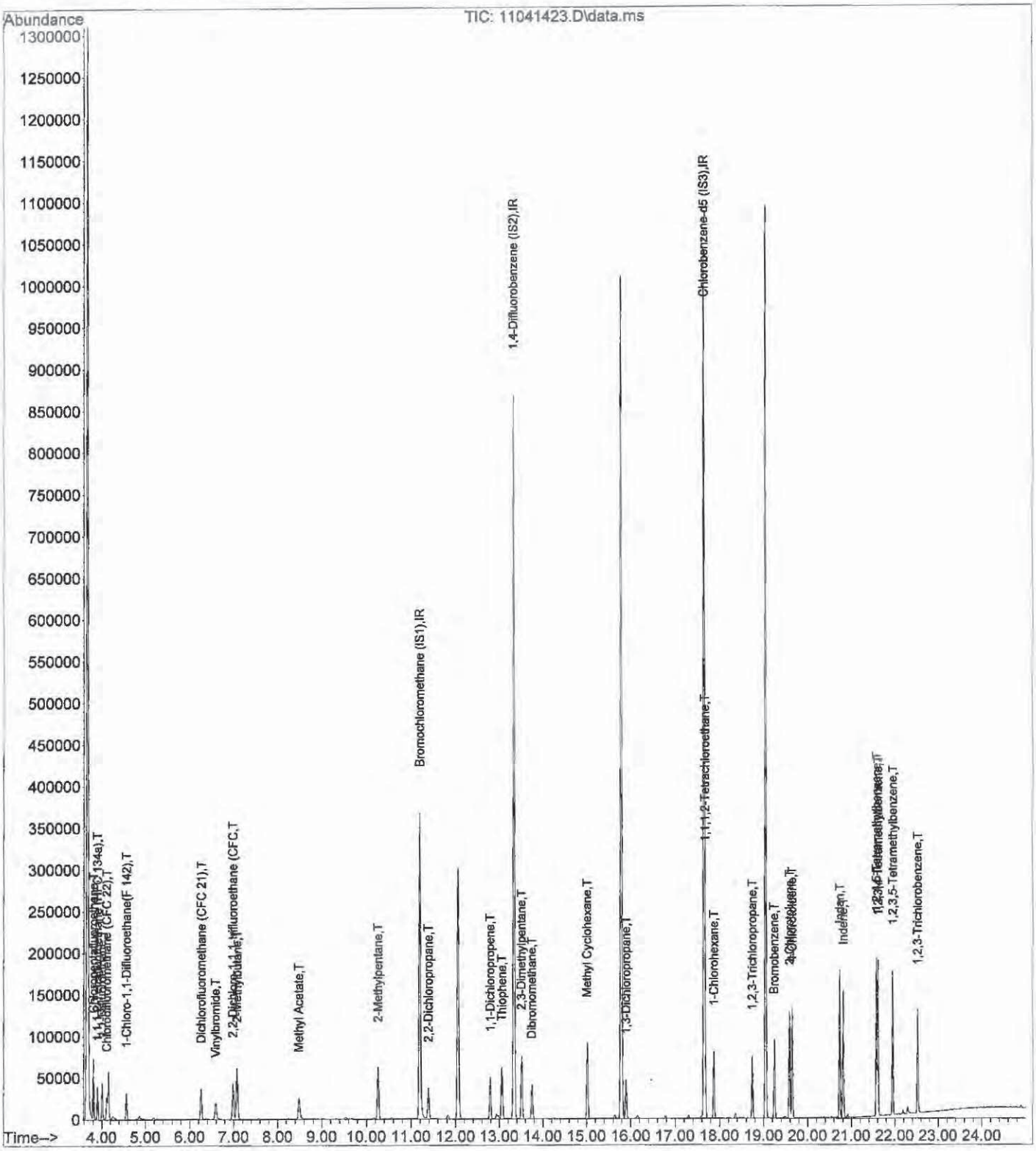
(#) = qualifier out of range (m) = manual integration (+) = signals summed

MR 11/5/14

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041423.D
Acq On : 5 Nov 2014 2:19 Operator: LH
Sample : 1.0ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041406 (12/3)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 05 09:13:31 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041424.D
Acq On : 5 Nov 2014 2:53 Operator: LH
Sample : 2.5ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041406 (12/3)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 05 09:13:34 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	196173	12.500	ng	-0.01
16) 1,4-Difluorobenzene (IS2)	13.33	114	918443	12.500	ng	-0.01
19) Chlorobenzene-d5 (IS3)	17.65	82	346831	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.80	85	67786	2.201	ng	99
3) 1,1,1,2-Tetrafluoroeth...	3.89	83	38863	1.773	ng	100
4) 1,1-Difluoroethane	4.00	65	48573	2.148	ng	99
5) Chlorodifluoromethane ...	4.10	67	11299	1.629	ng	99
6) 1-Chloro-1,1-Difluoroe...	4.57	65	66206	1.541	ng	99
7) Dichlorofluoromethane ...	6.25	67	102447	1.929	ng	100
8) Vinylbromide	6.58	108	49929	2.369	ng	98
9) 2,2-Dichloro-1,1,1-tri...	6.98	83	77822	2.266	ng	100
10) 2-Methylbutane	7.07	57	47162	1.900	ng	98
11) Methyl Acetate	8.48	43	100584	1.857	ng	99
12) 2-Methylpentane	10.26	71	45873	1.952	ng	96
13) 2,2-Dichloropropane	11.39	77	66807	1.863	ng	99
14) 1,1-Dichloropropene	12.79	75	66291	1.957	ng	100
15) Thiophene	13.06	84	116064	2.162	ng	99
17) 2,3-Dimethylpentane	13.51	56	85377	1.988	ng	99
18) Dibromomethane	13.74	174	51889	3.038	ng	99
20) Methyl Cyclohexane	15.02	55	69320	2.445	ng	99
21) 1,3-Dichloropropane	15.90	76	81649	2.705	ng	100
22) 1,1,1,2-Tetrachloroethane	17.68	131	54895	3.009	ng	100
23) 1-Chlorohexane	17.87	91	80411	2.793	ng	99
24) 1,2,3-Trichloropropane	18.74	75	78561	2.612	ng	100
25) Bromobenzene	19.24	77	95194	2.677	ng	99
26) 2-Chlorotoluene	19.59	91	172558	2.851	ng	99
27) 4-Chlorotoluene	19.65	91	176245	2.755	ng	98
28) Indan	20.73	117	218149	3.065	ng	99
29) Indene	20.81	115	195055	3.161	ng	100
30) 1,2,4,5-Tetramethylben...	21.57	119	230839	2.982	ng	100
31) 1,2,3,4-Tetramethylben...	21.61	119	225875	2.997	ng	100
32) 1,2,3,5-Tetramethylben...	21.94	119	220201	2.942	ng	99
33) 1,2,3-Trichlorobenzene	22.52	180	106368	3.426	ng	100

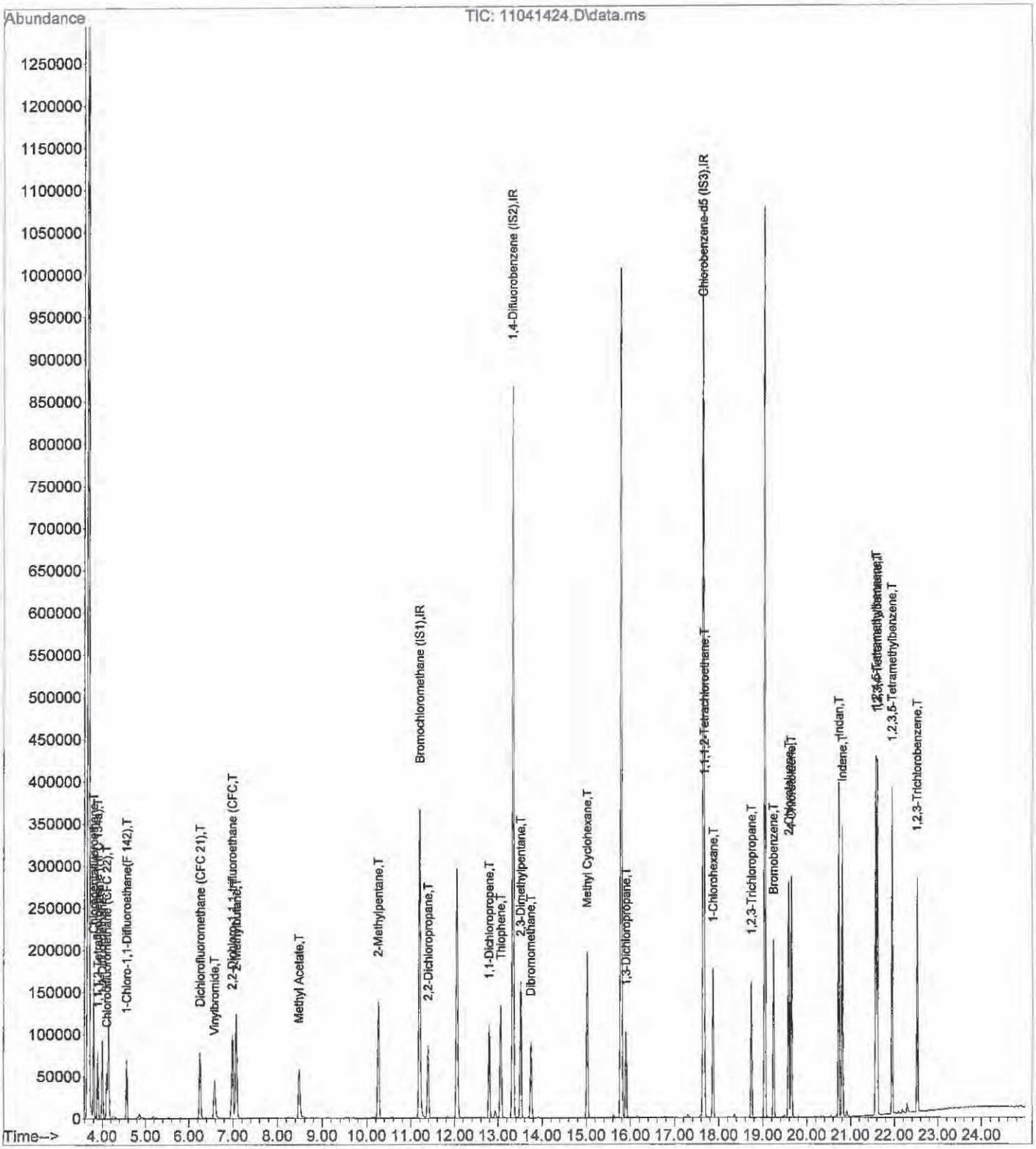
(#) = qualifier out of range (m) = manual integration (+) = signals summed

m 11/5/14

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041424.D
Acq On : 5 Nov 2014 2:53 Operator: LH
Sample : 2.5ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041406 (12/3)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 05 09:13:34 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041425.D
Acq On : 5 Nov 2014 3:28 Operator: LH
Sample : 5.0ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041406 (12/3)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 05 09:13:35 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	194860	12.500	ng	-0.01
16) 1,4-Difluorobenzene (IS2)	13.33	114	927794	12.500	ng	-0.01
19) Chlorobenzene-d5 (IS3)	17.65	82	341641	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.80	85	124294	4.063	ng	100
3) 1,1,1,2-Tetrafluoroeth...	3.88	83	69089	3.172	ng	97
4) 1,1-Difluoroethane	3.99	65	86095	3.832	ng	99
5) Chlorodifluoromethane ...	4.09	67	20821	3.022	ng	99
6) 1-Chloro-1,1-Difluoroe...	4.55	65	123533	2.896	ng	100
7) Dichlorofluoromethane ...	6.24	67	180953	3.429	ng	100
8) Vinylbromide	6.57	108	90714	4.332	ng	98
9) 2,2-Dichloro-1,1,1-tri...	6.98	83	139841	4.100	ng	100
10) 2-Methylbutane	7.07	57	81407	3.301	ng	99
11) Methyl Acetate	8.48	43	188041	3.496	ng	99
12) 2-Methylpentane	10.26	71	82587	3.538	ng	98
13) 2,2-Dichloropropane	11.39	77	121241	3.404	ng	100
14) 1,1-Dichloropropene	12.79	75	120248	3.575	ng	99
15) Thiophene	13.06	84	214125	4.016	ng	99
17) 2,3-Dimethylpentane	13.51	56	159830	3.684	ng	100
18) Dibromomethane	13.75	174	94698	5.489	ng	100
20) Methyl Cyclohexane	15.01	55	128316	4.595	ng	100
21) 1,3-Dichloropropane	15.90	76	149558	5.030	ng	99
22) 1,1,1,2-Tetrachloroethane	17.68	131	101707	5.660	ng	100
23) 1-Chlorohexane	17.87	91	146635	5.171	ng	99
24) 1,2,3-Trichloropropane	18.74	75	146497	4.945	ng	100
25) Bromobenzene	19.24	77	173754	4.961	ng	99
26) 2-Chlorotoluene	19.59	91	318302	5.338	ng	99
27) 4-Chlorotoluene	19.65	91	325314	5.162	ng	100
28) Indan	20.73	117	402485	5.742	ng	100
29) Indene	20.80	115	362966	5.971	ng	100
30) 1,2,4,5-Tetramethylben...	21.57	119	429886	5.638	ng	100
31) 1,2,3,4-Tetramethylben...	21.61	119	417103	5.619	ng	100
32) 1,2,3,5-Tetramethylben...	21.94	119	413298	5.606	ng	100
33) 1,2,3-Trichlorobenzene	22.53	180	201372	6.584	ng	100

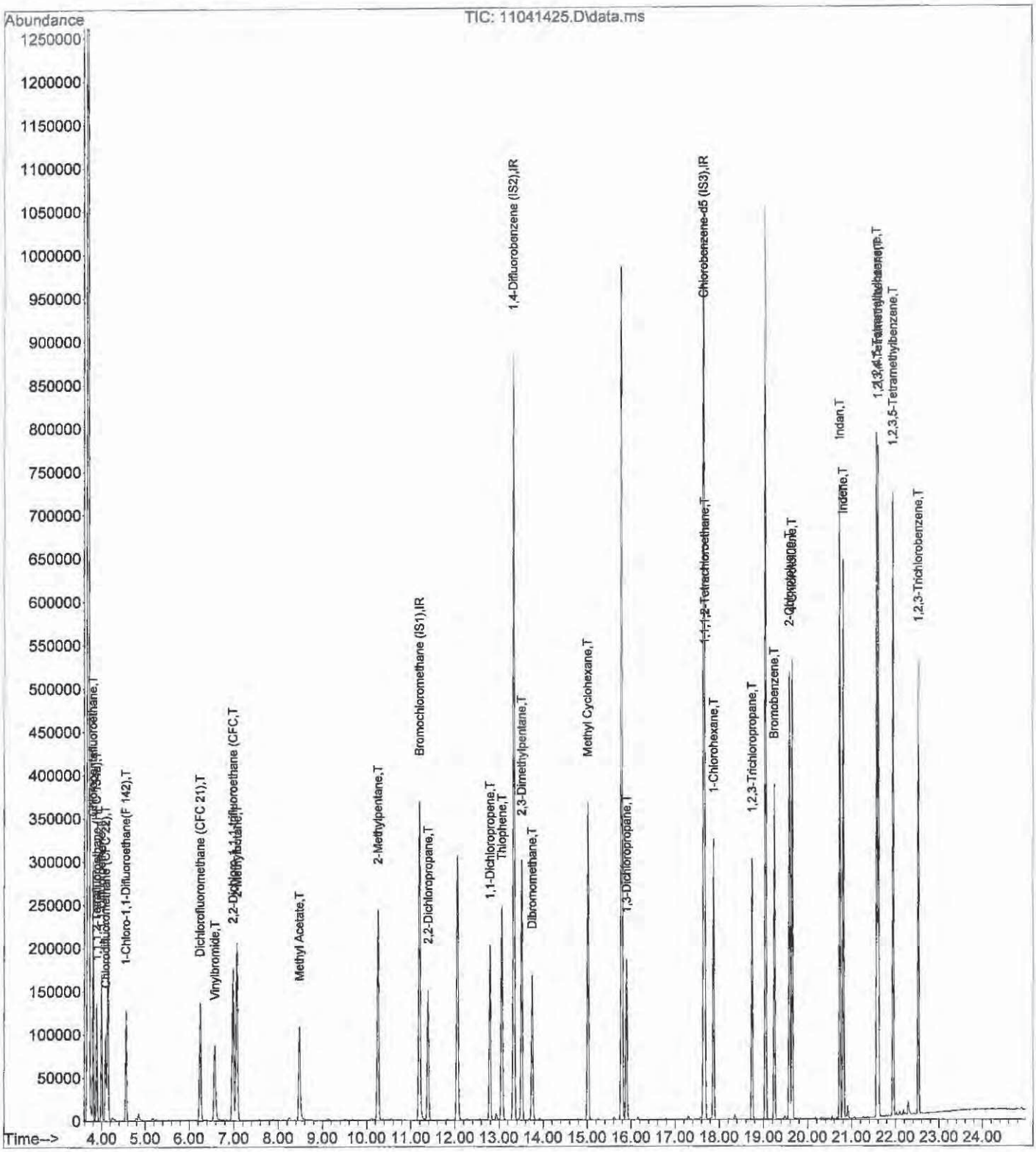
(#) = qualifier out of range (m) = manual integration (+) = signals summed

MH 11/5/14

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041425.D
Acq On : 5 Nov 2014 3:28 Operator: LH
Sample : 5.0ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041406 (12/3)
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Nov 05 09:13:35 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041426.D
Acq On : 5 Nov 2014 4:02 Operator: LH
Sample : 25ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041403 (12/3)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Nov 05 09:13:37 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	202704	12.500	ng	-0.01
16) 1,4-Difluorobenzene (IS2)	13.33	114	933073	12.500	ng	-0.01
19) Chlorobenzene-d5 (IS3)	17.65	82	360648	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.78	85	623385	19.589	ng	100
3) 1,1,1,2-Tetrafluoroeth...	3.88	83	388270	17.138	ng	100
4) 1,1-Difluoroethane	4.00	65	482411	20.641	ng	100
5) Chlorodifluoromethane ...	4.08	67	109263	15.247	ng	100
6) 1-Chloro-1,1-Difluoroe...	4.55	65	636646	14.345	ng	100
7) Dichlorofluoromethane ...	6.23	67	971532	17.700	ng	100
8) Vinylbromide	6.57	108	495413	22.745	ng	100
9) 2,2-Dichloro-1,1,1-tri...	6.97	83	700937	19.755	ng	100
10) 2-Methylbutane	7.07	57	427543	16.667	ng	100
11) Methyl Acetate	8.46	43	1007223	18.001	ng	100
12) 2-Methylpentane	10.26	71	428361	17.638	ng	100
13) 2,2-Dichloropropane	11.39	77	667802	18.024	ng	100
14) 1,1-Dichloropropene	12.80	75	670837	19.170	ng	100
15) Thiophene	13.06	84	1168762	21.074	ng	100
17) 2,3-Dimethylpentane	13.51	56	852611	19.542	ng	100
18) Dibromomethane	13.75	174	527827	30.419	ng	100
20) Methyl Cyclohexane	15.02	55	682817	23.163	ng	100
21) 1,3-Dichloropropane	15.90	76	801730	25.544	ng	100
22) 1,1,1,2-Tetrachloroethane	17.68	131	553313	29.167	ng	100
23) 1-Chlorohexane	17.87	91	789916	26.387	ng	100
24) 1,2,3-Trichloropropane	18.74	75	774305	24.758	ng	100
25) Bromobenzene	19.24	77	919680	24.876	ng	100
26) 2-Chlorotoluene	19.59	91	1670003	26.532	ng	100
27) 4-Chlorotoluene	19.65	91	1674792	25.174	ng	100
28) Indan	20.73	117	2117985	28.622	ng	100
29) Indene	20.81	115	1905983	29.700	ng	100
30) 1,2,4,5-Tetramethylben...	21.57	119	2178739	27.068	ng	100
31) 1,2,3,4-Tetramethylben...	21.61	119	2151820	27.459	ng	100
32) 1,2,3,5-Tetramethylben...	21.95	119	2105617	27.054	ng	100
33) 1,2,3-Trichlorobenzene	22.53	180	1050732	32.544	ng	100

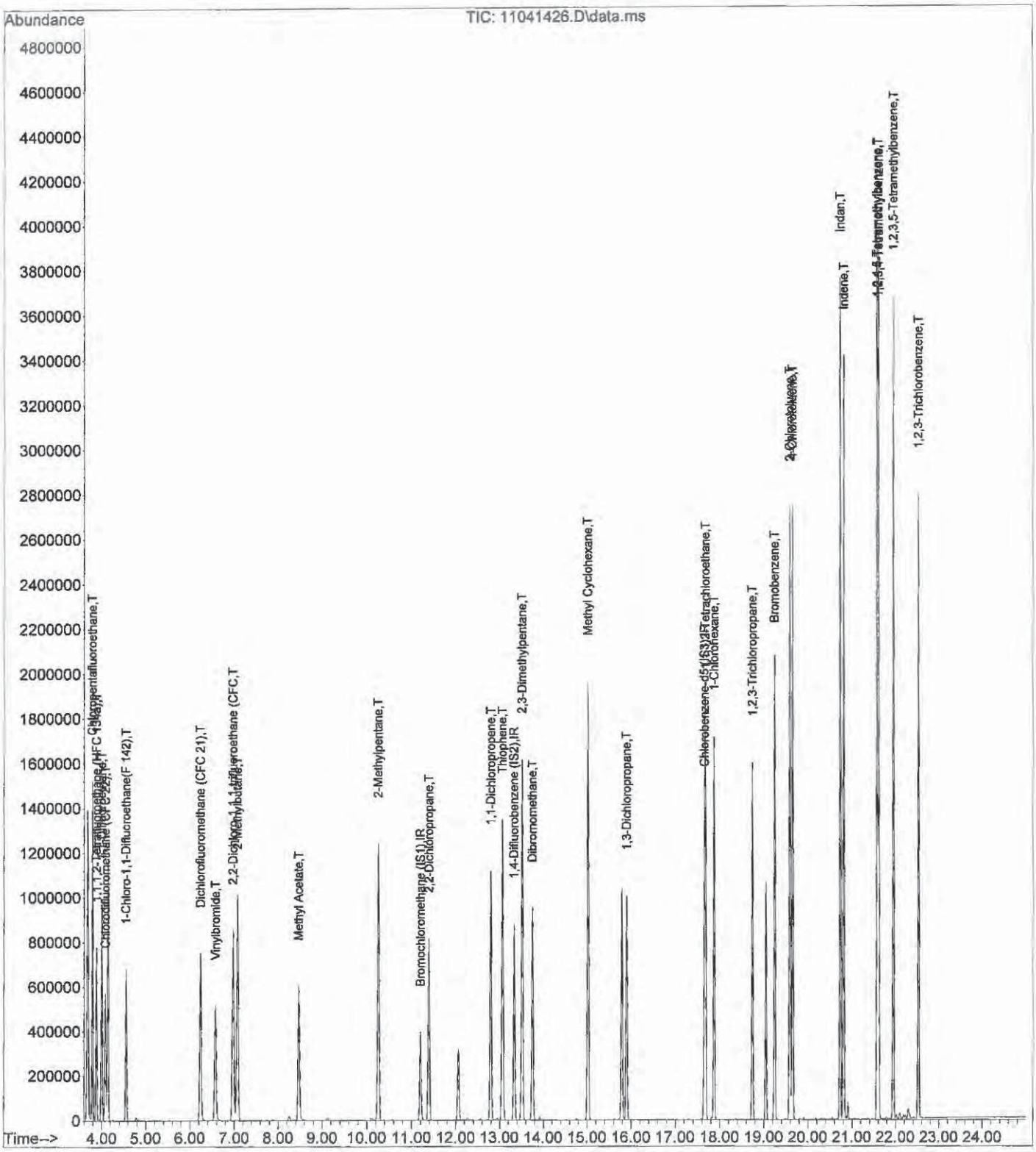
(#) = qualifier out of range (m) = manual integration (+) = signals summed

LH 11/5/14

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041426.D
Acq On : 5 Nov 2014 4:02 Operator: LH
Sample : 25ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041403 (12/3)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Nov 05 09:13:37 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041427.D
Acq On : 5 Nov 2014 4:36 Operator: LH
Sample : 50ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041403 (12/3)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Nov 05 09:13:40 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	201984	12.500	ng	0.00
16) 1,4-Difluorobenzene (IS2)	13.34	114	923356	12.500	ng	0.00
19) Chlorobenzene-d5 (IS3)	17.65	82	372595	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.79	85	1162814	36.670	ng	100
3) 1,1,1,2-Tetrafluoroeth...	3.89	83	701801	31.088	ng	100
4) 1,1-Difluoroethane	4.01	65	859747	36.918	ng	100
5) Chlorodifluoromethane ...	4.09	67	207225	29.019	ng	97
6) 1-Chloro-1,1-Difluoroe...	4.56	65	1249527	28.255	ng	100
7) Dichlorofluoromethane ...	6.24	67	1819377	33.264	ng	100
8) Vinylbromide	6.58	108	937854	43.212	ng	100
9) 2,2-Dichloro-1,1,1-tri...	6.97	83	1367011	38.664	ng	100
10) 2-Methylbutane	7.08	57	790323	30.919	ng	100
11) Methyl Acetate	8.47	43	1892596	33.944	ng	100
12) 2-Methylpentane	10.26	71	841679	34.781	ng	98
13) 2,2-Dichloropropane	11.39	77	1265344	34.273	ng	100
14) 1,1-Dichloropropene	12.80	75	1295236	37.146	ng	100
15) Thiophene	13.07	84	2194878	39.717	ng	100
17) 2,3-Dimethylpentane	13.51	56	1555790	36.034	ng	99
18) Dibromomethane	13.75	174	1038806	60.497	ng	99
20) Methyl Cyclohexane	15.02	55	1294505	42.505	ng	99
21) 1,3-Dichloropropane	15.90	76	1523690	46.990	ng	99
22) 1,1,1,2-Tetrachloroethane	17.68	131	1058866	54.026	ng	100
23) 1-Chlorohexane	17.87	91	1499250	48.476	ng	99
24) 1,2,3-Trichloropropane	18.74	75	1468683	45.455	ng	99
25) Bromobenzene	19.25	77	1733140	45.376	ng	99
26) 2-Chlorotoluene	19.59	91	3136275	48.230	ng	100
27) 4-Chlorotoluene	19.65	91	3099180	45.090	ng	99
28) Indan	20.73	117	3894165	50.938	ng	100
29) Indene	20.81	115	3556064	53.635	ng	100
30) 1,2,4,5-Tetramethylben...	21.57	119	4229267	50.859	ng	100
31) 1,2,3,4-Tetramethylben...	21.61	119	3737294	46.162	ng	99
32) 1,2,3,5-Tetramethylben...	21.95	119	3896890	48.464	ng	99
33) 1,2,3-Trichlorobenzene	22.53	180	2052613	61.536	ng	99

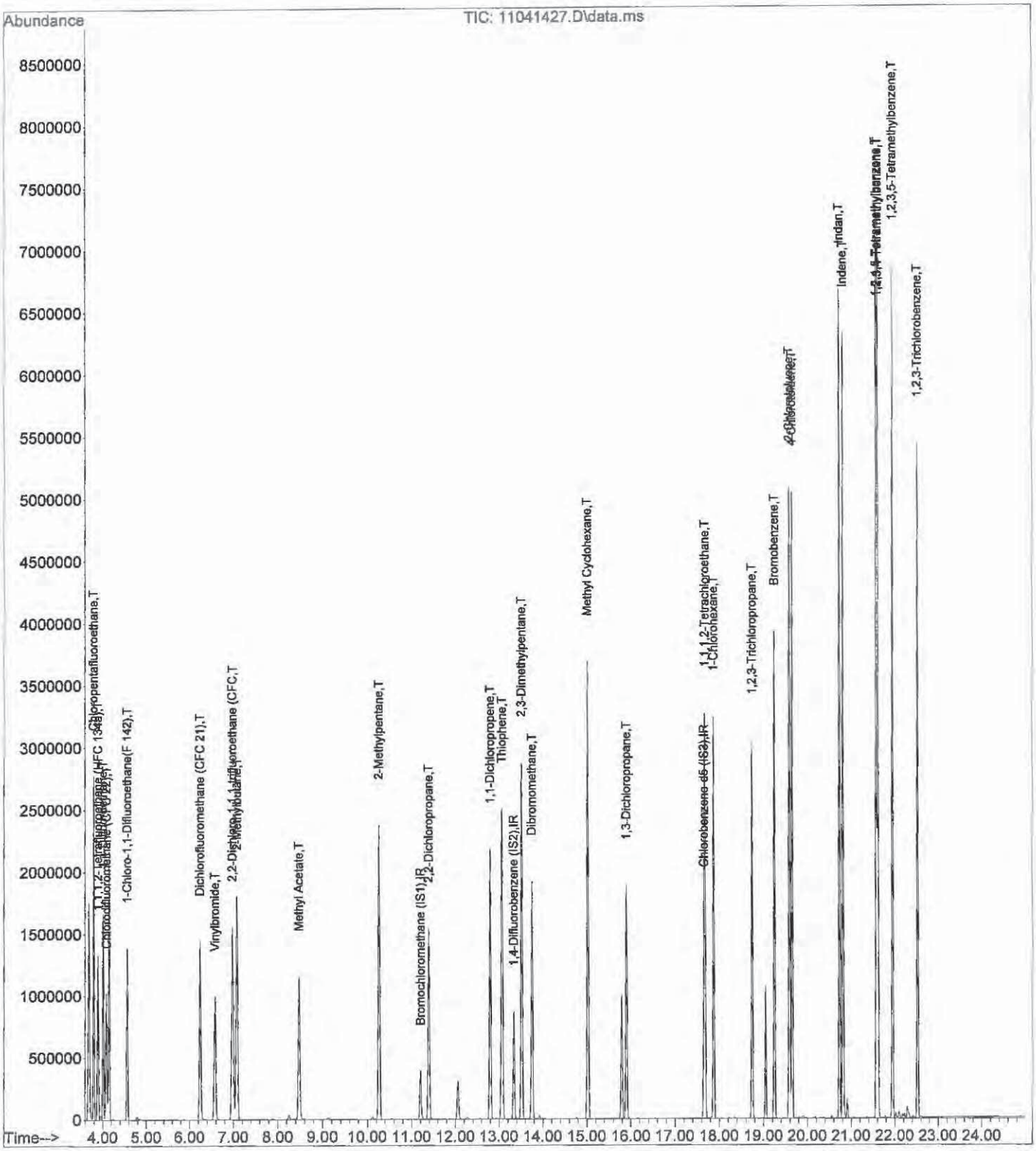
(#) = qualifier out of range (m) = manual integration (+) = signals summed

LH 11/5/14

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041427.D
Acq On : 5 Nov 2014 4:36 Operator: LH
Sample : 50ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041403 (12/3)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Nov 05 09:13:40 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041428.D
Acq On : 5 Nov 2014 5:10 Operator: LH
Sample : 100ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041403 (12/3)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Nov 05 09:13:42 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.21	130	199035	12.500	ng	0.00
16) 1,4-Difluorobenzene (IS2)	13.34	114	910328	12.500	ng	0.00
19) Chlorobenzene-d5 (IS3)	17.65	82	412651	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.80	85	2201993	70.469	ng	99
3) 1,1,1,2-Tetrafluoroeth...	3.89	83	1257689	56.538	ng	99
4) 1,1-Difluoroethane	4.02	65	1478563	64.430	ng	99
5) Chlorodifluoromethane ...	4.09	67	391620	55.654	ng	96
6) 1-Chloro-1,1-Difluoroe...	4.57	65	2454267	56.320	ng	100
7) Dichlorofluoromethane ...	6.24	67	3657579	67.863	ng	100
8) Vinylbromide	6.58	108	1912214	89.411	ng	99
9) 2,2-Dichloro-1,1,1-tri...	6.98	83	2701653	77.545	ng	100
10) 2-Methylbutane	7.08	57	1525465	60.563	ng	98
11) Methyl Acetate	8.48	43	3619291	65.875	ng	99
12) 2-Methylpentane	10.27	71	1615350	67.741	ng	94
13) 2,2-Dichloropropane	11.40	77	2310826	63.519	ng	100
14) 1,1-Dichloropropene	12.80	75	2493301	72.564	ng	99
15) Thiophene	13.07	84	4069318	74.726	ng	99
17) 2,3-Dimethylpentane	13.52	56	2786951	65.473	ng	99
18) Dibromomethane	13.75	174	1913317	113.021	ng	99
20) Methyl Cyclohexane	15.02	55	2236917	66.320	ng	97
21) 1,3-Dichloropropane	15.90	76	2945539	82.021	ng	99
22) 1,1,1,2-Tetrachloroethane	17.68	131	2063324	95.058	ng	99
23) 1-Chlorohexane	17.87	91	2875543	83.951	ng	98
24) 1,2,3-Trichloropropane	18.74	75	2759845	77.124	ng	99
25) Bromobenzene	19.25	77	3228261	76.316	ng	98
26) 2-Chlorotoluene	19.59	91	5698084	79.119	ng	99
27) 4-Chlorotoluene	19.65	91	5639793	74.089	ng	98
28) Indan	20.73	117	6881329	81.275	ng	98
29) Indene	20.81	115	6331906	86.232	ng	99
30) 1,2,4,5-Tetramethylben...	21.58	119	7242934	78.645	ng	100
31) 1,2,3,4-Tetramethylben...	21.62	119	6695620	74.675	ng	99
32) 1,2,3,5-Tetramethylben...	21.95	119	6876800	77.222	ng	99
33) 1,2,3-Trichlorobenzene	22.53	180	3813991	103.242	ng	98

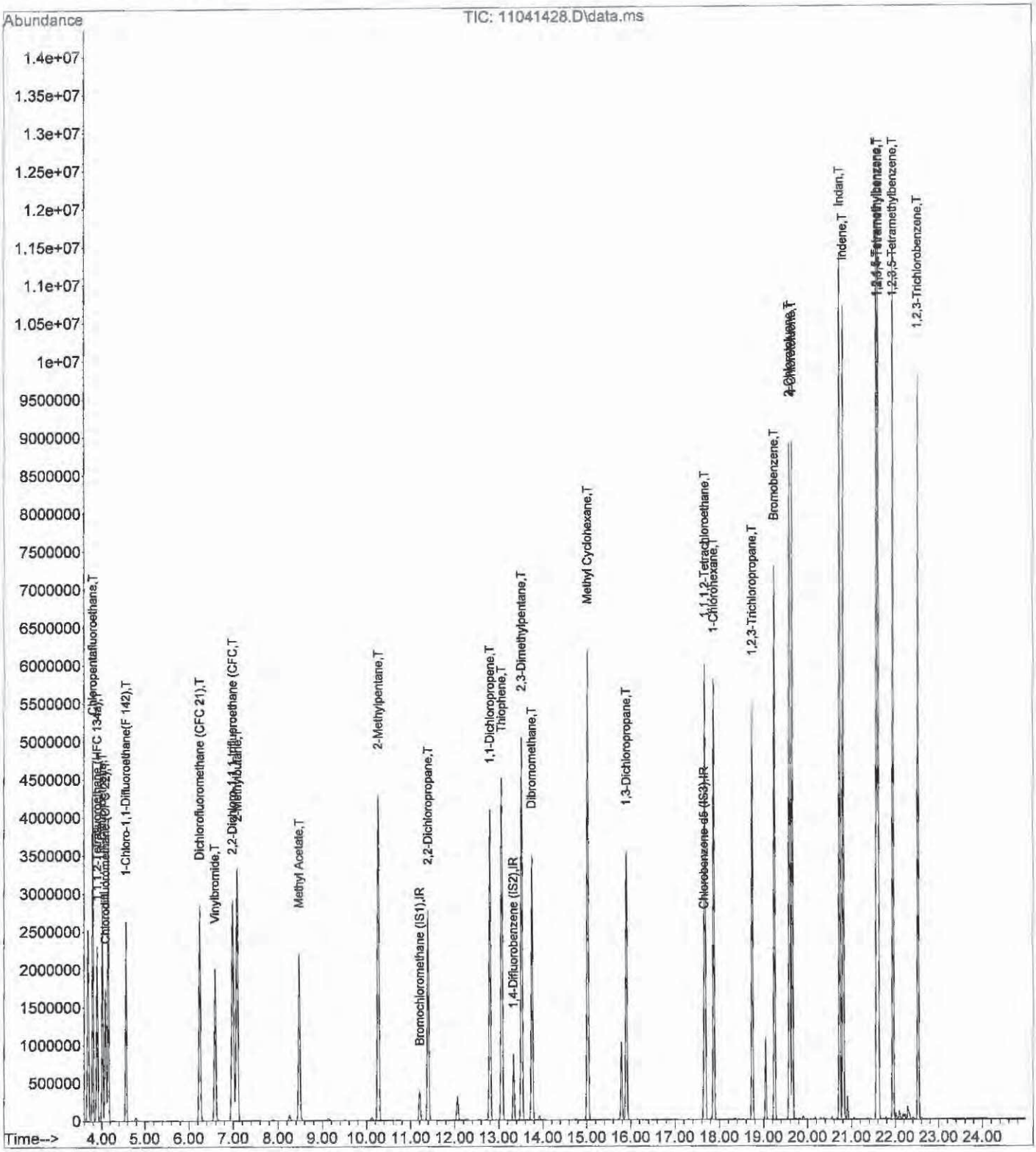
(#) = qualifier out of range (m) = manual integration (+) = signals summed

m 11/5/14

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041428.D
Acq On : 5 Nov 2014 5:10 Operator: LH
Sample : 100ng TO-15 Custom ICAL STD
Misc : S29-10091401/S29-11041403 (12/3)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Nov 05 09:13:42 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:13:04 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041429.D
Acq On : 5 Nov 2014 5:45 Operator: LH
Sample : 25ng TO-15 Custom ICV STD
Misc : S29-10091401/S29-10141406 (11/12)
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Nov 05 09:20:19 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	198471	12.500	ng	-0.01
16) 1,4-Difluorobenzene (IS2)	13.33	114	899937	12.500	ng	-0.01
19) Chlorobenzene-d5 (IS3)	17.65	82	368074	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.78	85	665288	25.689	ng	100
3) 1,1,1,2-Tetrafluoroeth...	3.88	83	376265	23.615	ng	99
4) 1,1-Difluoroethane	4.00	65	465960	24.674	ng	99
5) Chlorodifluoromethane ...	4.08	67	109943	24.731	ng	99
6) 1-Chloro-1,1-Difluoroe...	4.55	65	690237	24.569	ng	100
7) Dichlorofluoromethane ...	6.23	67	992776	23.342	ng	100
8) Vinylbromide	6.57	108	486786	23.576	ng	100
9) 2,2-Dichloro-1,1,1-tri...	6.97	83	710921	23.435	ng	100
10) 2-Methylbutane	7.07	57	448272	23.486	ng	99
11) Methyl Acetate	8.46	43	884067	21.553	ng	100
12) 2-Methylpentane	10.26	71	441946	22.704	ng	100
13) 2,2-Dichloropropane	11.39	77	625117	23.155	ng	100
14) 1,1-Dichloropropene	12.80	75	634484	23.073	ng	100
15) Thiophene	13.06	84	1100041	22.465	ng	100
17) 2,3-Dimethylpentane	13.51	56	800860	23.716	ng	100
18) Dibromomethane	13.75	174	474221	24.051	ng	100
20) Methyl Cyclohexane	15.02	55	642183	23.037	ng	100
21) 1,3-Dichloropropane	15.90	76	772823	23.321	ng	100
22) 1,1,1,2-Tetrachloroethane	17.68	131	518739	23.240	ng	100
23) 1-Chlorohexane	17.87	91	811017	24.192	ng	100
24) 1,2,3-Trichloropropane	18.74	75	762132	23.846	ng	100
25) Bromobenzene	19.24	77	925812	24.810	ng	100
26) 2-Chlorotoluene	19.59	91	1706405	25.297	ng	100
27) 4-Chlorotoluene	19.65	91	1667255	23.616	ng	100
28) Indan	20.73	117	2047083	22.784	ng	100
29) Indene	20.81	115	1736600	21.129	ng	99
30) 1,2,4,5-Tetramethylben...	21.57	119	2136066	22.279	ng	100
31) 1,2,3,4-Tetramethylben...	21.61	119	2100927	22.353	ng	100
32) 1,2,3,5-Tetramethylben...	21.95	119	2052943	21.813	ng	100
33) 1,2,3-Trichlorobenzene	22.53	180	907199	19.436	ng	99

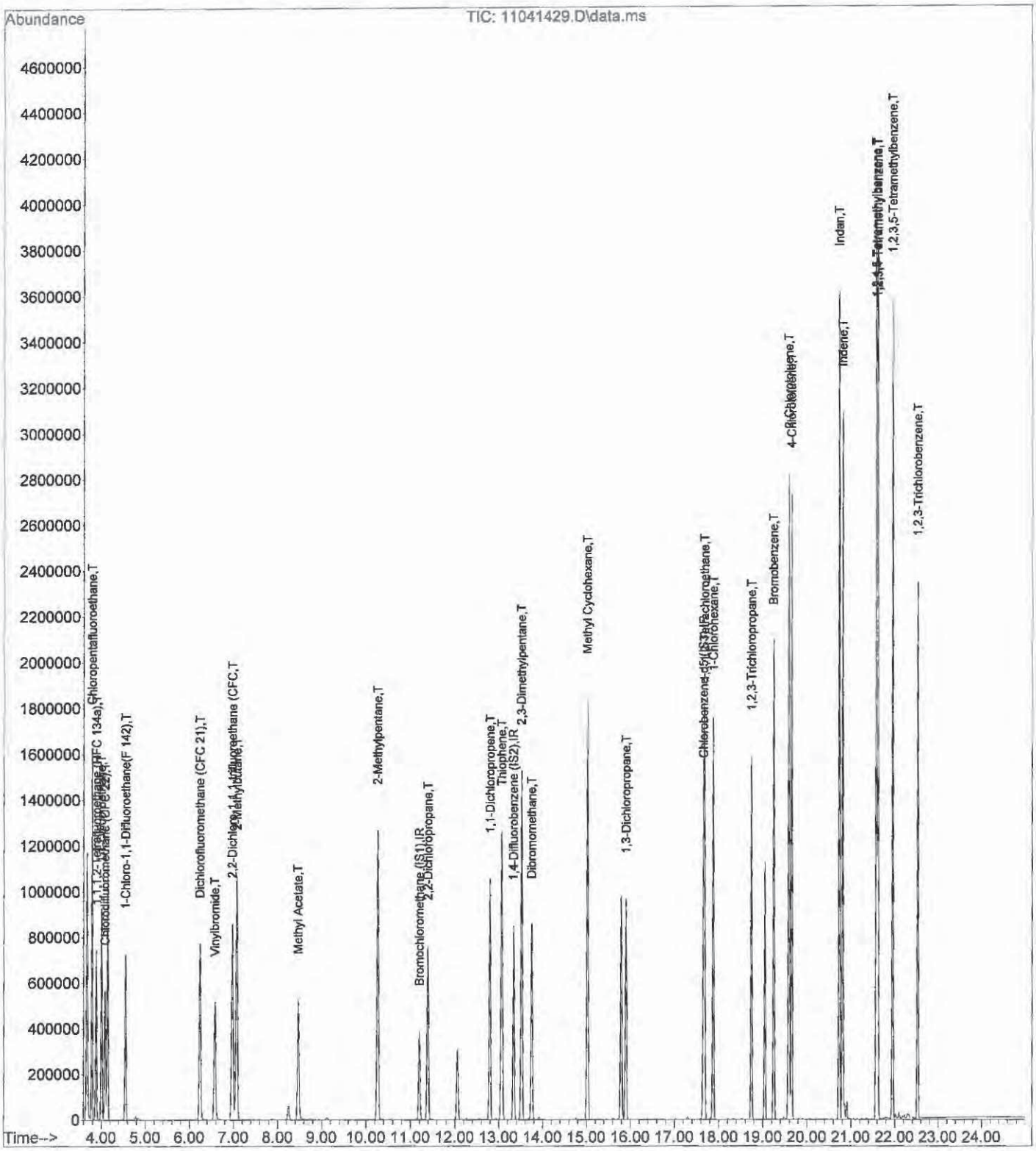
(#) = qualifier out of range (m) = manual integration (+) = signals summed

MP 11/5/14

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2014_11\04\11041429.D
Acq On : 5 Nov 2014 5:45 Operator: LH
Sample : 25ng TO-15 Custom ICV STD
Misc : S29-10091401/S29-10141406 (11/12)
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Nov 05 09:20:19 2014
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Wed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **11041429.D** Acq. Method File: **TO15.M**
Data File Path: **I:\MS16\DATA\2014_11\04** Sample Name: **25ng TO-15 Custom I**
Operator: **LH** Misc Info: **S29-10091401/S29-10**
Date Acquired: **11/5/14** **5:45** Instrument Name: **GCMS-16**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	AZ Check 70-130%
2)	Chloropentafluoroethane	3.78	25.7	26.75	96	70	130	*
3)	1,1,1,2-Tetrafluoroethane (HFC 1	3.88	23.6	26.00	91	70	130	*
4)	1,1-Difluoroethane	4.00	24.7	26.75	92	70	130	*
5)	Chlorodifluoromethane (CFC 22)	4.08	24.7	26.75	92	70	130	*
6)	1-Chloro-1,1-Difluoroethane(F 14	4.55	24.6	25.25	97	70	130	*
7)	Dichlorofluoromethane (CFC 21)	6.23	23.3	25.75	90	70	130	*
8)	Vinylbromide	6.57	23.6	25.25	93	70	130	*
9)	2,2-Dichloro-1,1,1-trifluoroethane	6.97	23.4	26.50	88	70	130	*
10)	2-Methylbutane	7.07	23.5	26.50	89	70	130	*
11)	Methyl Acetate	8.46	21.6	23.00	94	70	130	*
12)	2-Methylpentane	10.26	22.7	24.50	93	70	130	*
13)	2,2-Dichloropropane	11.39	23.2	25.25	92	70	130	*
14)	1,1-Dichloropropene	12.80	23.1	25.75	90	70	130	*
15)	Thiophene	13.06	22.5	25.50	88	70	130	*
17)	2,3-Dimethylpentane	13.51	23.7	26.00	91	70	130	*
18)	Dibromomethane	13.75	24.1	26.00	93	70	130	*
20)	Methyl Cyclohexane	15.02	23.0	26.75	86	70	130	*
21)	1,3-Dichloropropane	15.90	23.3	26.50	88	70	130	*
22)	1,1,1,2-Tetrachloroethane	17.68	23.2	25.00	93	70	130	*
23)	1-Chlorohexane	17.87	24.2	26.00	93	70	130	*
24)	1,2,3-Trichloropropane	18.74	23.8	26.50	90	70	130	*
25)	Bromobenzene	19.24	24.8	26.75	93	70	130	*
26)	2-Chlorotoluene	19.59	25.3	27.50	92	70	130	*
27)	4-Chlorotoluene	19.65	23.6	26.75	88	70	130	*
28)	Indan	20.73	22.8	25.75	89	70	130	*
29)	Indene	20.81	21.1	25.50	83	70	130	*
30)	1,2,4,5-Tetramethylbenzene	21.57	22.3	25.75	87	70	130	*
31)	1,2,3,4-Tetramethylbenzene	21.61	22.4	25.75	87	70	130	*
32)	1,2,3,5-Tetramethylbenzene	21.95	21.8	25.50	85	70	130	*
33)	1,2,3-Trichlorobenzene	22.53	19.4	25.50	76	70	130	*

* = Pass

11/5/14

Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2015_02\03\02031503.D
Acq On : 3 Feb 2015 2:11 Operator: LH
Sample : CCV R16020315_25ng
Misc : S29-01071501/S29-01081503 (2/6)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Feb 03 06:33:32 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 2/3/15

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	117	0.01
2	T	Propene	1.120	0.901	19.6	102	-0.04
3	T	Dichlorodifluoromethane (CF	2.460	1.985	19.3	92	-0.03
4	T	Chloromethane	1.661	1.285	22.6	88	-0.04
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.498	1.220	18.6	97	-0.03
6	T	Vinyl Chloride	1.691	1.452	14.1	96	-0.04
7	T	1,3-Butadiene	1.030	1.026	0.4	106	-0.03
8	T	Bromomethane	1.260	1.155	8.3	98	-0.03
9	T	Chloroethane	0.920	0.816	11.3	95	-0.03
10	T	Ethanol	0.776	0.631	18.7	96	0.03
11	T	Acetonitrile	1.937	1.631	15.8	98	0.00
12	T	Acrolein	0.682	0.524	23.2	88	-0.02
13	T	Acetone	0.838	0.686	18.1	97	-0.01
14	T	Trichlorofluoromethane	1.796	1.606	10.6	107	-0.01
15	T	2-Propanol (Isopropanol)	2.648	2.106	20.5	93	0.00
16	T	Acrylonitrile	1.483	1.328	10.5	97	0.00
17	T	1,1-Dichloroethene	1.244	1.060	14.8	93	-0.02
18	T	2-Methyl-2-Propanol (tert-B	2.717	1.903	30.0	80	0.00
19	T	Methylene Chloride	1.300	1.062	18.3	97	0.00
20	T	3-Chloro-1-propene (Allyl C	1.203	1.167	3.0	98	0.00
21	T	Trichlorotrifluoroethane	1.147	0.906	21.0	93	0.00
22	T	Carbon Disulfide	4.649	3.919	15.7	98	-0.02
23	T	trans-1,2-Dichloroethene	1.497	1.352	9.7	100	0.00
24	T	1,1-Dichloroethane	1.923	1.683	12.5	102	0.02
25	T	Methyl tert-Butyl Ether	3.138	2.597	17.2	93	-0.02
26	T	Vinyl Acetate	0.284	0.243	14.4	94	0.00
27	T	2-Butanone (MEK)	0.805	0.680	15.5	101	-0.02
28	T	cis-1,2-Dichloroethene	1.423	1.272	10.6	100	0.00
29	T	Diisopropyl Ether	1.116	0.983	11.9	101	0.00
30	T	Ethyl Acetate	0.408	0.358	12.3	103	-0.01
31	T	n-Hexane	1.600	1.340	16.3	114	0.00
32	T	Chloroform	1.919	1.693	11.8	102	0.02
33	S	1,2-Dichloroethane-d4(SS1)	1.081	1.100	-1.8	121	0.01
34	T	Tetrahydrofuran (THF)	0.821	0.675	17.8	101	-0.03
35	T	Ethyl tert-Butyl Ether	1.349	1.199	11.1	98	0.00
36	T	1,2-Dichloroethane	1.165	1.051	9.8	104	0.00
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	117	0.00
38	T	1,1,1-Trichloroethane	0.363	0.322	11.3	99	0.00
39	T	Isopropyl Acetate	0.147	0.127	13.6	99	-0.01
40	T	1-Butanol	0.244	0.182	25.4	89	-0.02
41	T	Benzene	1.014	0.855	15.7	103	0.00
42	T	Carbon Tetrachloride	0.303	0.267	11.9	97	0.00
43	T	Cyclohexane	0.391	0.342	12.5	100	0.00
44	T	tert-Amyl Methyl Ether	0.699	0.615	12.0	98	0.00
45	T	1,2-Dichloropropane	0.241	0.215	10.8	100	0.00
46	T	Bromodichloromethane	0.324	0.295	9.0	98	0.00
47	T	Trichloroethene	0.314	0.284	9.6	103	0.00
48	T	1,4-Dioxane	0.241	0.195	19.1	96	-0.02
49	T	2,2,4-Trimethylpentane (Iso	1.001	0.856	14.5	100	0.00
50	T	Methyl Methacrylate	0.109	0.100	8.3	97	0.00
51	T	n-Heptane	0.227	0.201	11.5	105	0.00
52	T	cis-1,3-Dichloropropene	0.372	0.352	5.4	98	0.00
53	T	4-Methyl-2-pentanone	0.220	0.190	13.6	92	-0.01
54	T	trans-1,3-Dichloropropene	0.315	0.309	1.9	97	0.00

Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2015_02\03\02031503.D
Acq On : 3 Feb 2015 2:11 Operator: LH
Sample : CCV R16020315_25ng
Misc : S29-01071501/S29-01081503 (2/6)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Feb 03 06:33:32 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
55	T	1,1,2-Trichloroethane	0.271	0.233	14.0	94	0.00
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	111	0.00
57	S	Toluene-d8 (SS2)	2.454	2.502	-2.0	115	0.00
58	T	Toluene	3.191	2.634	17.5	98	0.00
59	T	2-Hexanone	1.313	1.153	12.2	95	-0.01
60	T	Dibromochloromethane	0.884	0.824	6.8	93	0.00
61	T	1,2-Dibromoethane	0.858	0.799	6.9	95	0.00
62	T	n-Butyl Acetate	1.481	1.220	17.6	92	0.00
63	T	n-Octane	0.529	0.490	7.4	100	0.00
64	T	Tetrachloroethene	1.125	0.996	11.5	98	0.00
65	T	Chlorobenzene	2.163	1.856	14.2	95	0.00
66	T	Ethylbenzene	3.282	2.947	10.2	95	0.00
67	T	m- p- ylenes	2.597	2.262	12.9	94	0.00
68	T	Bromoform	0.820	0.827	-0.9	99	0.00
69	T	Styrene	2.162	2.022	6.5	98	0.00
70	T	o- ylene	2.676	2.421	9.5	99	0.00
71	T	n-Nonane	1.145	1.068	6.7	101	0.00
72	T	1,1,2,2-Tetrachloroethane	1.406	1.280	9.0	95	0.00
73	S	Bromofluorobenzene (SS3)	1.197	1.264	-5.6	119	0.00
74	T	Cumene	3.678	3.338	9.2	99	0.00
75	T	alpha-Pinene	1.669	1.582	5.2	97	0.00
76	T	n-Propylbenzene	4.368	3.954	9.5	99	0.00
77	T	3-Ethyltoluene	3.613	3.116	13.8	98	0.00
78	T	4-Ethyltoluene	3.454	3.148	8.9	97	0.00
79	T	1,3,5-Trimethylbenzene	2.957	2.567	13.2	96	0.00
80	T	alpha-Methylstyrene	1.613	1.467	9.1	93	0.00
81	T	2-Ethyltoluene	3.453	3.032	12.2	96	0.00
82	T	1,2,4-Trimethylbenzene	2.914	2.522	13.5	95	0.00
83	T	n-Decane	1.398	1.208	13.6	96	0.00
84	T	Benzyl Chloride	2.254	2.033	9.8	88	0.00
85	T	1,3-Dichlorobenzene	2.032	1.725	15.1	95	0.00
86	T	1,4-Dichlorobenzene	2.227	1.840	17.4	96	0.00
87	T	sec-Butylbenzene	3.963	3.422	13.7	95	0.00
88	T	4-Isopropyltoluene (p-Cymen	3.811	3.186	16.4	97	0.00
89	T	1,2,3-Trimethylbenzene	3.139	2.664	15.1	97	0.00
90	T	1,2-Dichlorobenzene	1.975	1.680	14.9	97	0.00
91	T	d-Limonene	0.951	0.884	7.0	96	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.700	0.658	6.0	93	0.00
93	T	n-Undecane	1.492	1.266	15.1	94	0.00
94	T	1,2,4-Trichlorobenzene	1.529	1.341	12.3	93	0.00
95	T	Naphthalene	4.351	3.728	14.3	92	0.00
96	T	n-Dodecane	1.344	1.003	25.4	86	0.00
97	T	Hexachlorobutadiene	0.978	0.827	15.4	94	0.00
98	T	Cyclohexanone	0.874	0.708	19.0	88	-0.01
99	T	tert-Butylbenzene	2.924	2.521	13.8	96	0.00
100	T	n-Butylbenzene	3.132	2.585	17.5	95	0.00

(#) = Out of Range SPCC s out = 0 CCC s out = 0

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031503.D
Acq On : 3 Feb 2015 2:11 Operator: LH
Sample : CCV R16020315_25ng
Misc : S29-01071501/S29-01081503 (2/6)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Feb 03 06:33:32 2015
Quant Method : I:\MS16\METHODS\R16112414.M LH 2/3/15
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.21	130	193257	12.500	ng		0.01
37) 1,4-Difluorobenzene (IS2)	13.34	114	876054	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.65	82	304625	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.06	65	212579	12.719	ng		0.01
Spiked Amount 12.500			Recovery = 101.76%				
57) Toluene-d8 (SS2)	15.79	98	762137	12.745	ng		0.00
Spiked Amount 12.500			Recovery = 102.00%				
73) Bromofluorobenzene (SS3)	19.04	174	384915	13.192	ng		0.00
Spiked Amount 12.500			Recovery = 105.52%				
Target Compounds							Qvalue
2) Propene	4.10	42	344588	19.908	ng		100
3) Dichlorodifluoromethan...	4.26	85	728872	19.163	ng		100
4) Chloromethane	4.54	50	501523	19.531	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.81	135	480936	20.767	ng		100
6) Vinyl Chloride	4.96	62	561294	21.470	ng		100
7) 1,3-Butadiene	5.23	54	412256	25.887	ng		99
8) Bromomethane	5.67	94	455461	23.374	ng		100
9) Chloroethane	6.01	64	318442	22.399	ng		100
10) Ethanol	6.38	45	1259414	104.970	ng		100
11) Acetonitrile	6.63	41	668417	22.319	ng		100
12) Acrolein	6.83	56	228755	21.680	ng		100
13) Acetone	7.03	58	1446885	111.685	ng		96
14) Trichlorofluoromethane	7.28	101	670511	24.152	ng		100
15) 2-Propanol (Isopropanol)	7.53	45	1741637	42.549	ng		99
16) Acrylonitrile	7.79	53	544154	23.732	ng		99
17) 1,1-Dichloroethene	8.24	96	446565	23.222	ng		98
18) 2-Methyl-2-Propanol (t...	8.41	59	1573755	37.464	ng		99
19) Methylene Chloride	8.48	84	463990	23.080	ng		97
20) 3-Chloro-1-propene (Al...	8.63	41	491750	26.439	ng		99
21) Trichlorotrifluoroethane	8.89	151	381809	21.525	ng		99
22) Carbon Disulfide	8.73	76	1590349	22.128	ng		100
23) trans-1,2-Dichloroethene	9.76	61	554090	23.944	ng		99
24) 1,1-Dichloroethane	10.01	63	695835	23.399	ng		100
25) Methyl tert-Butyl Ether	10.10	73	1093914	22.550	ng		100
26) Vinyl Acetate	10.27	86	492409	112.075	ng	#	94
27) 2-Butanone (MEK)	10.51	72	291926	23.459	ng		100
28) cis-1,2-Dichloroethene	11.03	61	540630	24.579	ng		99
29) Diisopropyl Ether	11.33	87	417911	24.223	ng	#	93
30) Ethyl Acetate	11.33	61	295973	46.884	ng		99
31) n-Hexane	11.31	57	554103	22.395	ng		99
32) Chloroform	11.38	83	732702	24.702	ng		100
34) Tetrahydrofuran (THF)	11.78	72	289640	22.818	ng		98
35) Ethyl tert-Butyl Ether	11.92	87	500497	23.997	ng		98
36) 1,2-Dichloroethane	12.18	62	438793	24.366	ng		99
38) 1,1,1-Trichloroethane	12.46	97	592627	23.277	ng		100
39) Isopropyl Acetate	12.89	61	509889	49.646	ng		99
40) 1-Butanol	12.91	56	727641	42.623	ng		95
41) Benzene	12.94	78	1693725	23.832	ng		100
42) Carbon Tetrachloride	13.10	117	538542	25.392	ng		100
43) Cyclohexane	13.23	84	1280516	46.699	ng		99
44) tert-Amyl Methyl Ether	13.58	73	1152606	23.540	ng		99
45) 1,2-Dichloropropane	13.79	63	410043	24.244	ng		100
46) Bromodichloromethane	13.99	83	563491	24.820	ng		100
47) Trichloroethene	14.04	130	537965	24.409	ng		99
48) 1,4-Dioxane	14.01	88	371960	21.981	ng		99
49) 2,2,4-Trimethylpentane...	14.11	57	1604992	22.872	ng		100

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031503.D
Acq On : 3 Feb 2015 2:11 Operator: LH
Sample : CCV R16020315_25ng
Misc : S29-01071501/S29-01081503 (2/6)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Feb 03 06:33:32 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

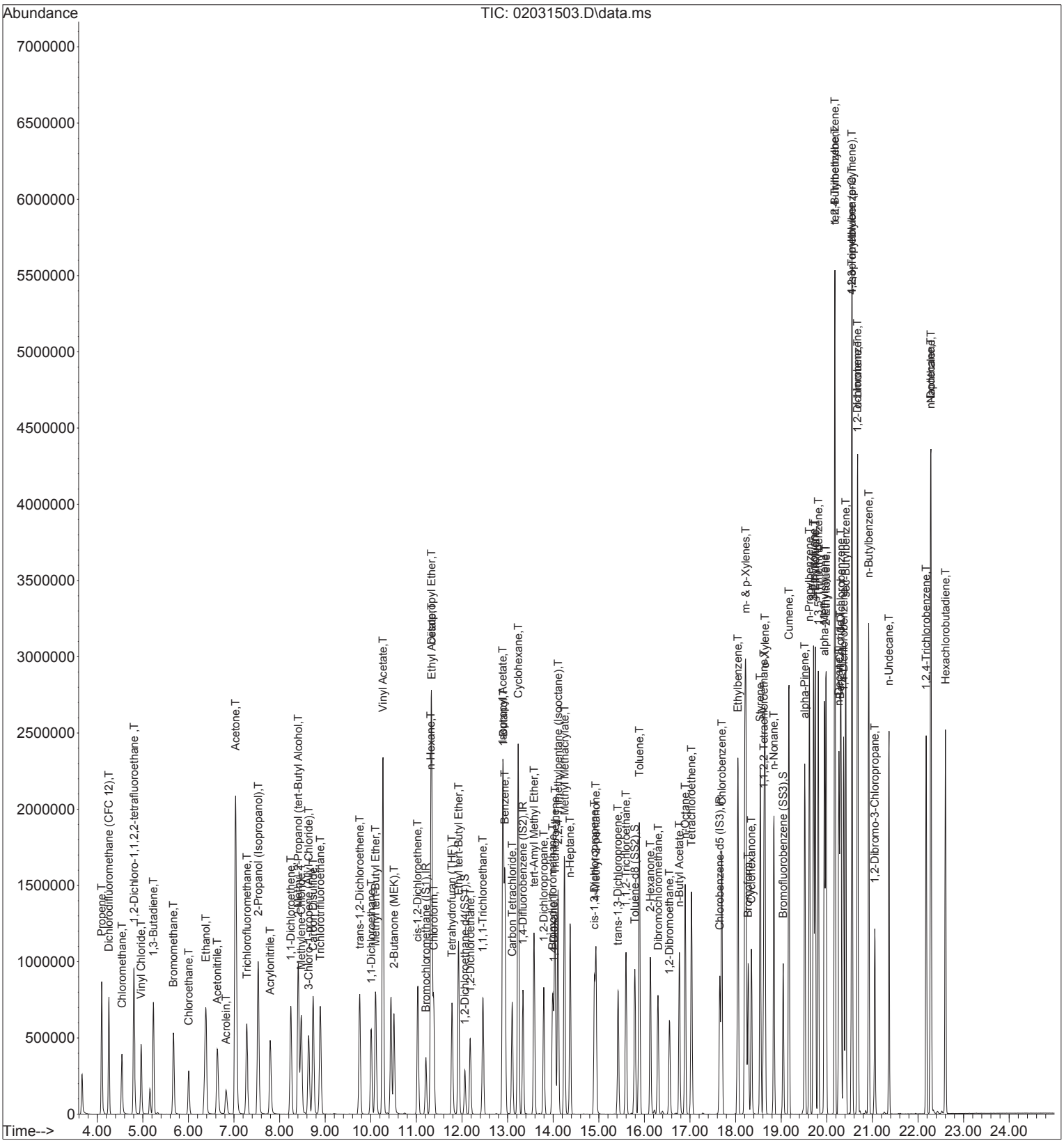
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	14.25	100	374992	48.928	ng	99
51) n-Heptane	14.37	71	384560	24.128	ng	99
52) cis-1,3-Dichloropropene	14.90	75	647508	24.815	ng	100
53) 4-Methyl-2-pentanone	14.94	58	369376	23.963	ng	97
54) trans-1,3-Dichloropropene	15.42	75	574326	25.989	ng	100
55) 1,1,2-Trichloroethane	15.60	97	445692	23.469	ng	99
58) Toluene	15.89	91	1765403	22.700	ng	100
59) 2-Hexanone	16.13	43	772687	24.143	ng	98
60) Dibromochloromethane	16.30	129	552365	25.645	ng	100
61) 1,2-Dibromoethane	16.55	107	535358	25.603	ng	99
62) n-Butyl Acetate	16.77	43	862026	23.879	ng	99
63) n-Octane	16.89	57	316444	24.547	ng	99
64) Tetrachloroethene	17.03	166	613019	22.366	ng	99
65) Chlorobenzene	17.70	112	1255007	23.812	ng	100
66) Ethylbenzene	18.05	91	1974945	24.696	ng	100
67) m- p- ylenes	18.22	91	2976453	47.031	ng	98
68) Bromoform	18.27	173	574571	28.738	ng	100
69) Styrene	18.54	104	1379925	26.196	ng	100
70) o- ylene	18.64	91	1563303	23.968	ng	100
71) n-Nonane	18.84	43	676635	24.258	ng	99
72) 1,1,2,2-Tetrachloroethane	18.62	83	818706	23.895	ng	100
74) Cumene	19.17	105	2115266	23.598	ng	100
75) alpha-Pinene	19.52	93	1031088	25.351	ng	98
76) n-Propylbenzene	19.62	91	2480934	23.304	ng	100
77) 3-Ethyltoluene	19.71	105	2050541	23.291	ng	96
78) 4-Ethyltoluene	19.75	105	2071676	24.610	ng	95
79) 1,3,5-Trimethylbenzene	19.81	105	1673180	23.222	ng	100
80) alpha-Methylstyrene	19.95	118	965130	24.551	ng	100
81) 2-Ethyltoluene	19.98	105	1995103	23.706	ng	100
82) 1,2,4-Trimethylbenzene	20.18	105	1674848	23.585	ng	100
83) n-Decane	20.27	57	780159	22.894	ng	100
84) Benzyl Chloride	20.29	91	1412017	25.711	ng	100
85) 1,3-Dichlorobenzene	20.31	146	1198368	24.199	ng	100
86) 1,4-Dichlorobenzene	20.37	146	1188190	21.891	ng	99
87) sec-Butylbenzene	20.41	105	2272180	23.526	ng	100
88) 4-Isopropyltoluene (p-...	20.55	119	2076774	22.363	ng	100
89) 1,2,3-Trimethylbenzene	20.55	105	1720174	22.487	ng	100
90) 1,2-Dichlorobenzene	20.67	146	1136412	23.613	ng	100
91) d-Limonene	20.68	68	576064	24.844	ng	99
92) 1,2-Dibromo-3-Chloropr...	21.05	157	441059	25.860	ng	100
93) n-Undecane	21.37	57	801864	22.050	ng	100
94) 1,2,4-Trichlorobenzene	22.18	180	923220	24.772	ng	100
95) Naphthalene	22.28	128	2521213	23.780	ng	100
96) n-Dodecane	22.28	57	690562	21.087	ng	99
97) Hexachlorobutadiene	22.60	225	564113	23.678	ng	100
98) Cyclohexanone	18.35	55	509332	23.916	ng	99
99) tert-Butylbenzene	20.18	119	1658790	23.276	ng	100
100) n-Butylbenzene	20.92	91	1763600	23.108	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031503.D
Acq On : 3 Feb 2015 2:11 Operator: LH
Sample : CCV R16020315_25ng
Misc : S29-01071501/S29-01081503 (2/6)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Feb 03 06:33:32 2015
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2015_02\03\02031501.D
Acq On : 3 Feb 2015 1:03 Operator: LH
Sample : CCV ACF16020315_25ng
Misc : S29-01071501/S29-01291502 (2/27)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Feb 03 09:17:40 2015
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : ed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 2/3/15

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	89	-0.01
2	T	Chloropentafluoroethane	1.631	1.491	8.6	91	0.01
3	T	1,1,1,2-Tetrafluoroethane (	1.004	0.958	4.6	91	0.00
4	T	1,1-Difluoroethane	1.189	1.108	6.8	87	0.00
5	T	Chlorodifluoromethane (CFC	0.280	0.272	2.9	94	0.01
6	T	1-Chloro-1,1-Difluoroethane	1.769	1.668	5.7	96	0.00
7	T	Dichlorofluoromethane (CFC	2.679	2.479	7.5	92	0.00
8	T	Vinylbromide	1.300	1.233	5.2	91	0.00
9	T	2,2-Dichloro-1,1,1-trifluor	1.911	1.764	7.7	95	0.00
10	T	2-Methylbutane	1.202	1.039	13.6	89	0.00
11	T	Methyl Acetate	2.583	2.097	18.8	77	0.00
12	T	2-Methylpentane	1.226	1.105	9.9	92	0.00
13	T	2,2-Dichloropropane	1.700	1.503	11.6	83	0.00
14	T	1,1-Dichloropropene	1.732	1.619	6.5	90	0.00
15	T	Thiophene	3.084	2.815	8.7	88	-0.01
16	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	86	-0.01
17	T	2,3-Dimethylpentane	0.469	0.445	5.1	86	-0.01
18	T	Dibromomethane	0.274	0.261	4.7	86	0.00
19	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	84	-0.01
20	T	Methyl Cyclohexane	0.947	0.865	8.7	82	-0.01
21	T	1,3-Dichloropropane	1.125	1.112	1.2	88	-0.01
22	T	1,1,1,2-Tetrachloroethane	0.758	0.724	4.5	84	0.00
23	T	1-Chlorohexane	1.138	1.155	-1.5	90	-0.01
24	T	1,2,3-Trichloropropane	1.085	1.068	1.6	89	-0.01
25	T	Bromobenzene	1.267	1.253	1.1	88	-0.01
26	T	2-Chlorotoluene	2.291	2.333	-1.8	92	0.00
27	T	4-Chlorotoluene	2.398	2.411	-0.5	92	-0.01
28	T	Indan	3.051	3.141	-2.9	92	-0.01
29	T	Indene	2.791	2.962	-6.1	93	-0.01
30	T	1,2,4,5-Tetramethylbenzene	3.256	3.429	-5.3	96	0.00
31	T	1,2,3,4-Tetramethylbenzene	3.192	3.354	-5.1	94	0.00
32	T	1,2,3,5-Tetramethylbenzene	3.196	3.371	-5.5	95	-0.01
33	T	1,2,3-Trichlorobenzene	1.585	1.679	-5.9	95	-0.01

(#) = Out of Range SPCC s out = 0 CCC s out = 0

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031501.D
Acq On : 3 Feb 2015 1:03 Operator: LH
Sample : CCV ACF16020315_25ng
Misc : S29-01071501/S29-01291502 (2/27)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: Feb 03 09:17:40 2015
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : ed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 2/3/15

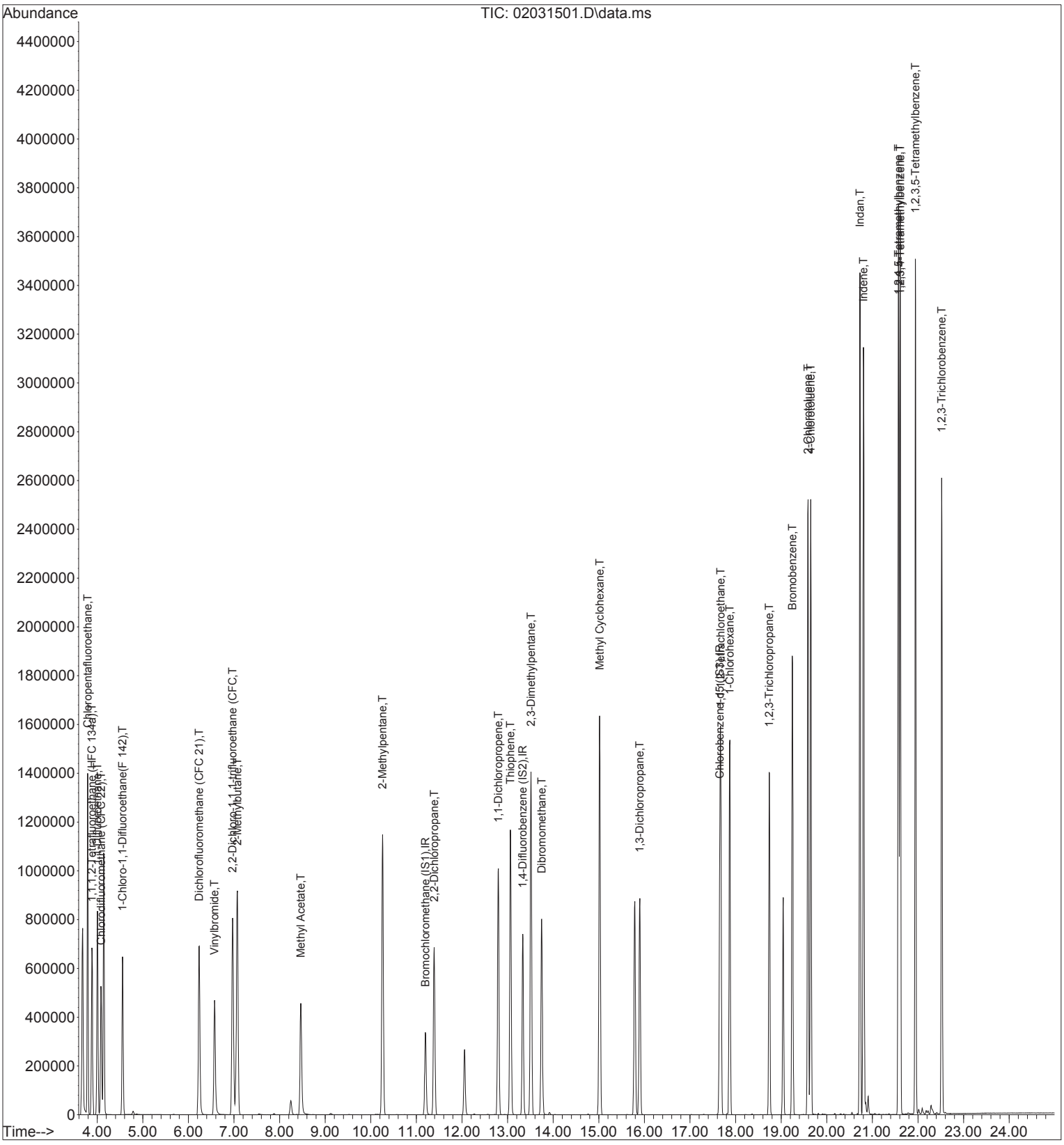
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.20	130	180340	12.500	ng	-0.01
16) 1,4-Difluorobenzene (IS2)	13.33	114	801076	12.500	ng	-0.01
19) Chlorobenzene-d5 (IS3)	17.65	82	303370	12.500	ng	-0.01
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.79	85	564495	23.989	ng	99
3) 1,1,1,2-Tetrafluoroeth...	3.88	83	352439	24.343	ng	98
4) 1,1-Difluoroethane	4.00	65	419602	24.453	ng	100
5) Chlorodifluoromethane ...	4.09	67	103098	25.523	ng	95
6) 1-Chloro-1,1-Difluoroe...	4.55	65	613756	24.043	ng	99
7) Dichlorofluoromethane ...	6.23	67	894063	23.135	ng	100
8) Vinylbromide	6.57	108	449076	23.936	ng	100
9) 2,2-Dichloro-1,1,1-tri...	6.97	83	667926	24.231	ng	99
10) 2-Methylbutane	7.07	57	378484	21.823	ng	96
11) Methyl Acetate	8.46	43	778855	20.897	ng	100
12) 2-Methylpentane	10.26	71	394531	22.306	ng	99
13) 2,2-Dichloropropane	11.39	77	552918	22.539	ng	100
14) 1,1-Dichloropropene	12.80	75	601593	24.077	ng	99
15) Thiophene	13.06	84	1025317	23.044	ng	99
17) 2,3-Dimethylpentane	13.51	56	734903	24.448	ng	99
18) Dibromomethane	13.75	174	451964	25.751	ng	97
20) Methyl Cyclohexane	15.02	55	561892	24.455	ng	99
21) 1,3-Dichloropropane	15.90	76	708562	25.942	ng	100
22) 1,1,1,2-Tetrachloroethane	17.68	131	465372	25.296	ng	100
23) 1-Chlorohexane	17.87	91	714777	25.869	ng	100
24) 1,2,3-Trichloropropane	18.74	75	686565	26.063	ng	98
25) Bromobenzene	19.24	77	813164	26.439	ng	95
26) 2-Chlorotoluene	19.59	91	1543172	27.756	ng	99
27) 4-Chlorotoluene	19.65	91	1535705	26.393	ng	98
28) Indan	20.73	117	1944126	26.253	ng	100
29) Indene	20.80	115	1779263	26.265	ng	100
30) 1,2,4,5-Tetramethylben...	21.57	119	2080774	26.331	ng	99
31) 1,2,3,4-Tetramethylben...	21.61	119	2014934	26.010	ng	99
32) 1,2,3,5-Tetramethylben...	21.94	119	2004454	25.840	ng	99
33) 1,2,3-Trichlorobenzene	22.52	180	998296	25.950	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_02\03\02031501.D
Acq On : 3 Feb 2015 1:03 Operator: LH
Sample : CCV ACF16020315_25ng
Misc : S29-01071501/S29-01291502 (2/27)
ALS Vial : 3 Sample Multiplier: 1

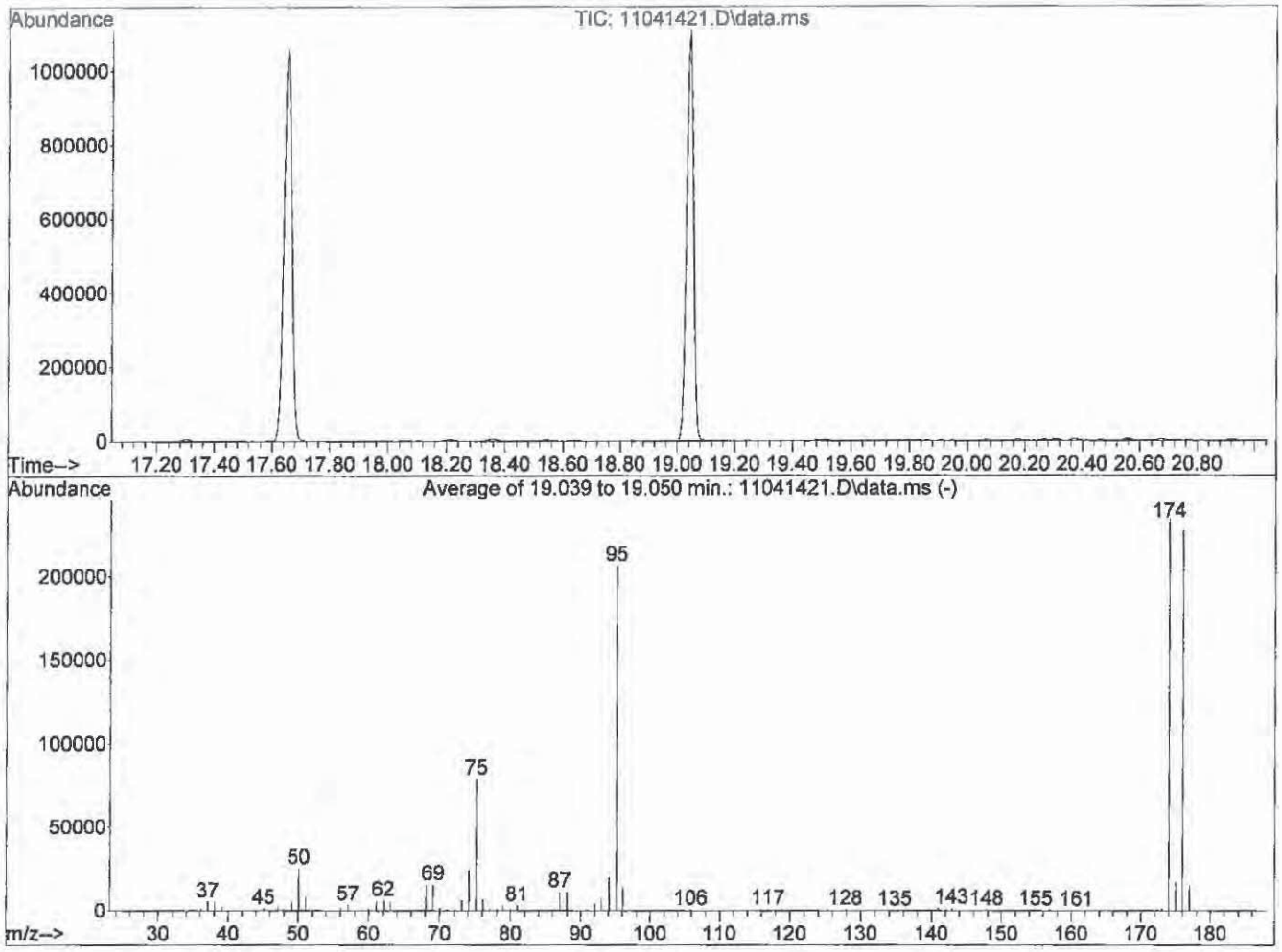
Quant Time: Feb 03 09:17:40 2015
Quant Method : I:\MS16\METHODS\ACF16110414.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : ed Nov 05 09:18:53 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data Path : I:\MS16\DATA\2014_11\04\
Data File : 11041421.D
Acq On : 5 Nov 2014 1:12
Operator : LH
Sample : 12.5ng TO-15 BFB
Misc : S29-10091401
ALS Vial : 2 Sample Multiplier: 1

Integration File: RTEINTVB.P

Method : I:\MS16\METHODS\ACF16110414.M
Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
Last Update : Thu Sep 25 08:24:52 2014



AutoFind: Scans 2810, 2811, 2812; Background Corrected with Scan 2800

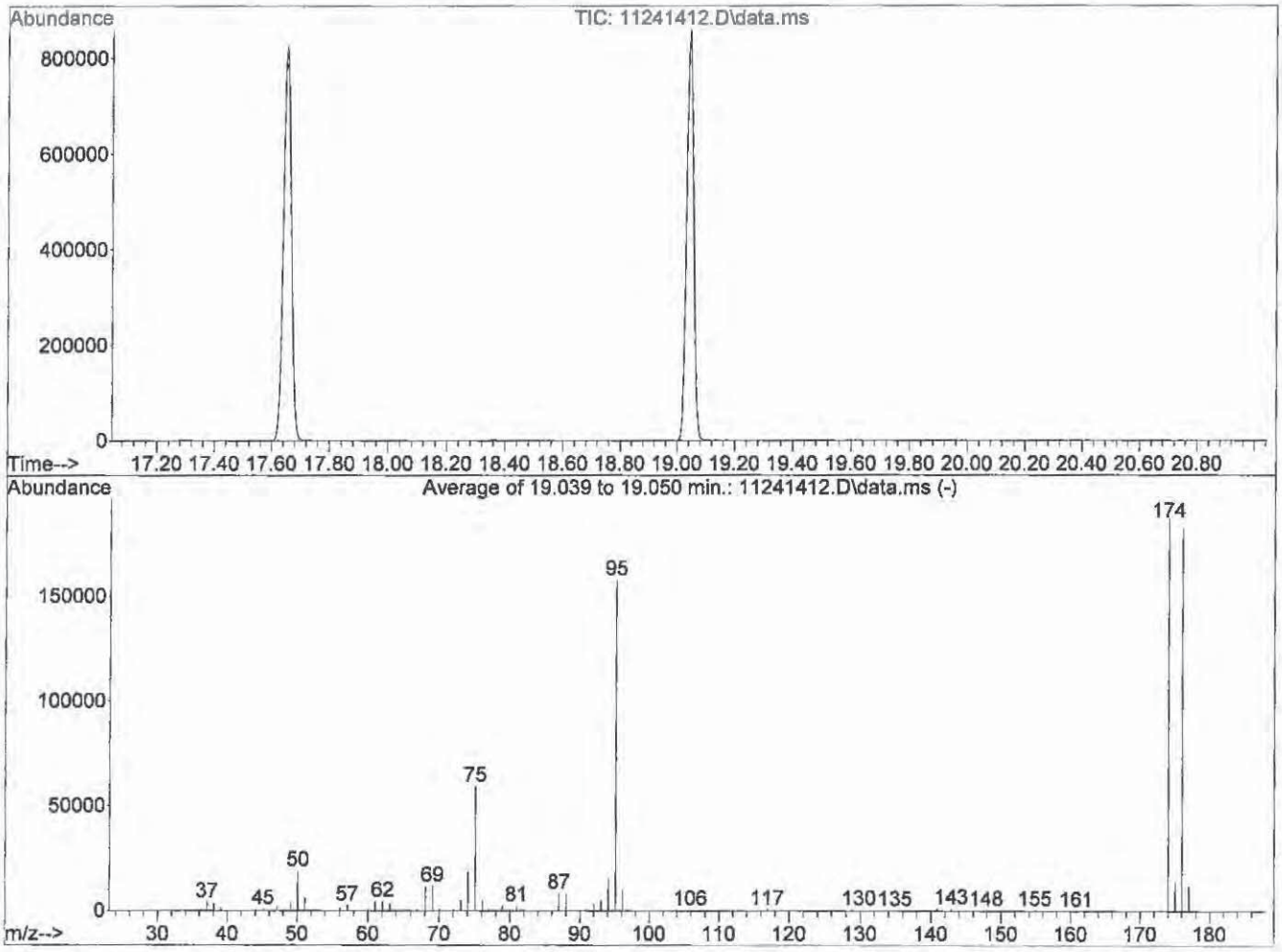
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	12.2	25261	PASS
75	95	30	66	38.1	78592	PASS
95	95	100	100	100.0	206251	PASS
96	95	5	9	6.6	13647	PASS
173	174	0.00	2	0.5	1268	PASS
174	95	50	120	113.5	234155	PASS
175	174	4	9	7.2	16931	PASS
176	174	93	101	96.9	226816	PASS
177	176	5	9	6.6	14987	PASS

LH 11/5/14

Data Path : I:\MS16\DATA\2014_11\24\
Data File : 11241412.D
Acq On : 24 Nov 2014 16:22
Operator : LH
Sample : 12.5ng TO-15 BFB
Misc : S29-11141401
ALS Vial : 2 Sample Multiplier: 1

Integration File: RTEINT.P

Method : I:\MS16\METHODS\R16112414.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Thu Nov 06 08:30:44 2014



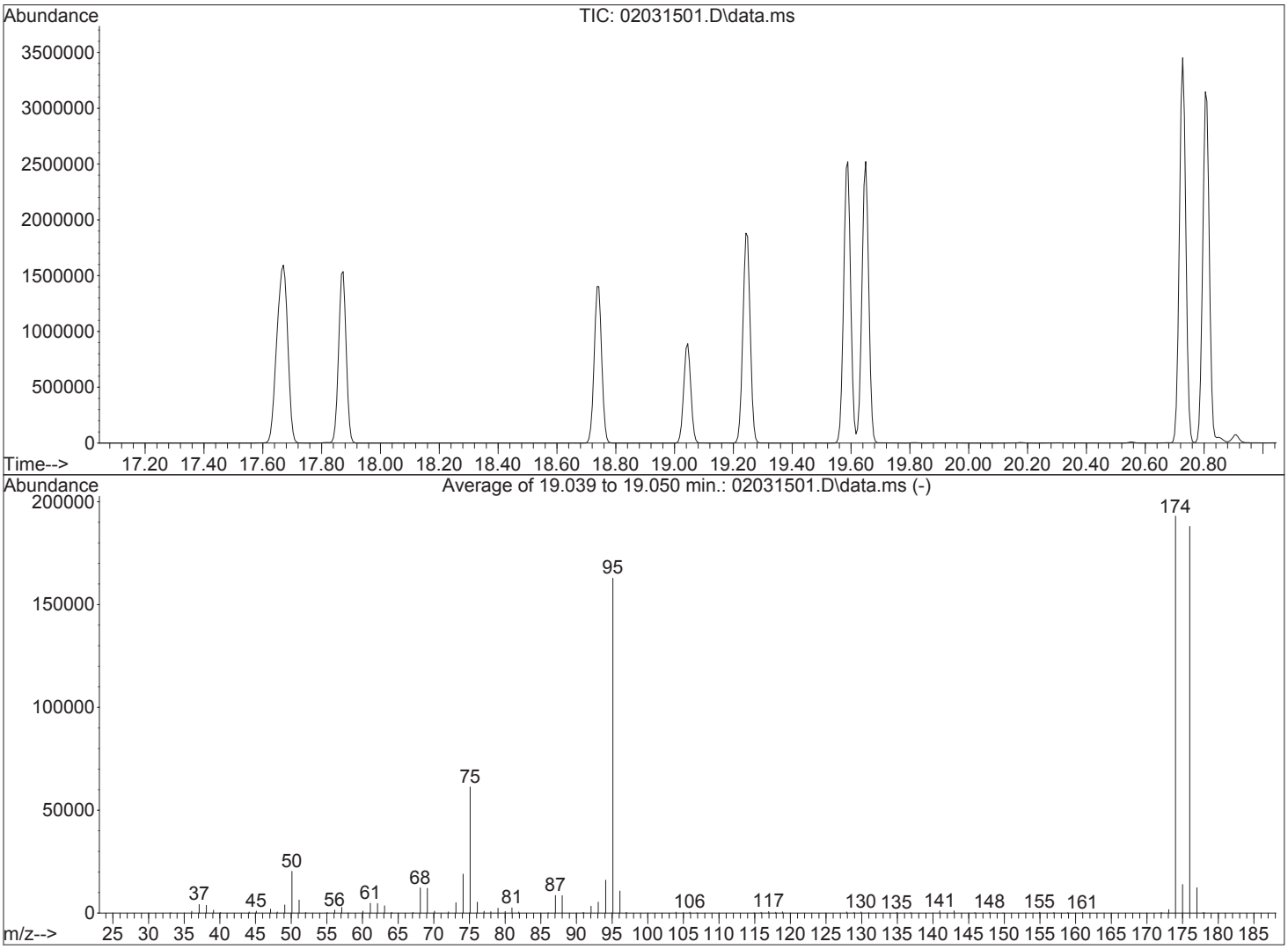
AutoFind: Scans 2810, 2811, 2812; Background Corrected with Scan 2801

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	12.0	18928	PASS
75	95	30	66	37.6	59147	PASS
95	95	100	100	100.0	157440	PASS
96	95	5	9	6.4	10142	PASS
173	174	0.00	2	0.3	483	PASS
174	95	50	120	118.6	186731	PASS
175	174	4	9	7.3	13668	PASS
176	174	93	101	97.4	181803	PASS
177	176	5	9	6.5	11838	PASS

Data Path : I:\MS16\DATA\2015_02\03\
Data File : 02031501.D
Acq On : 3 Feb 2015 1:03
Operator : LH
Sample : CCV ACF16020315_25ng
Misc : S29-01071501/S29-01291502 (2/27)
ALS Vial : 3 Sample Multiplier: 1

Integration File: RTEINTVB.P

Method : I:\MS16\METHODS\ACF16110414.M
Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
Last Update : ed Nov 05 09:18:53 2014



AutoFind: Scans 2810, 2811, 2812 Background Corrected with Scan 2801

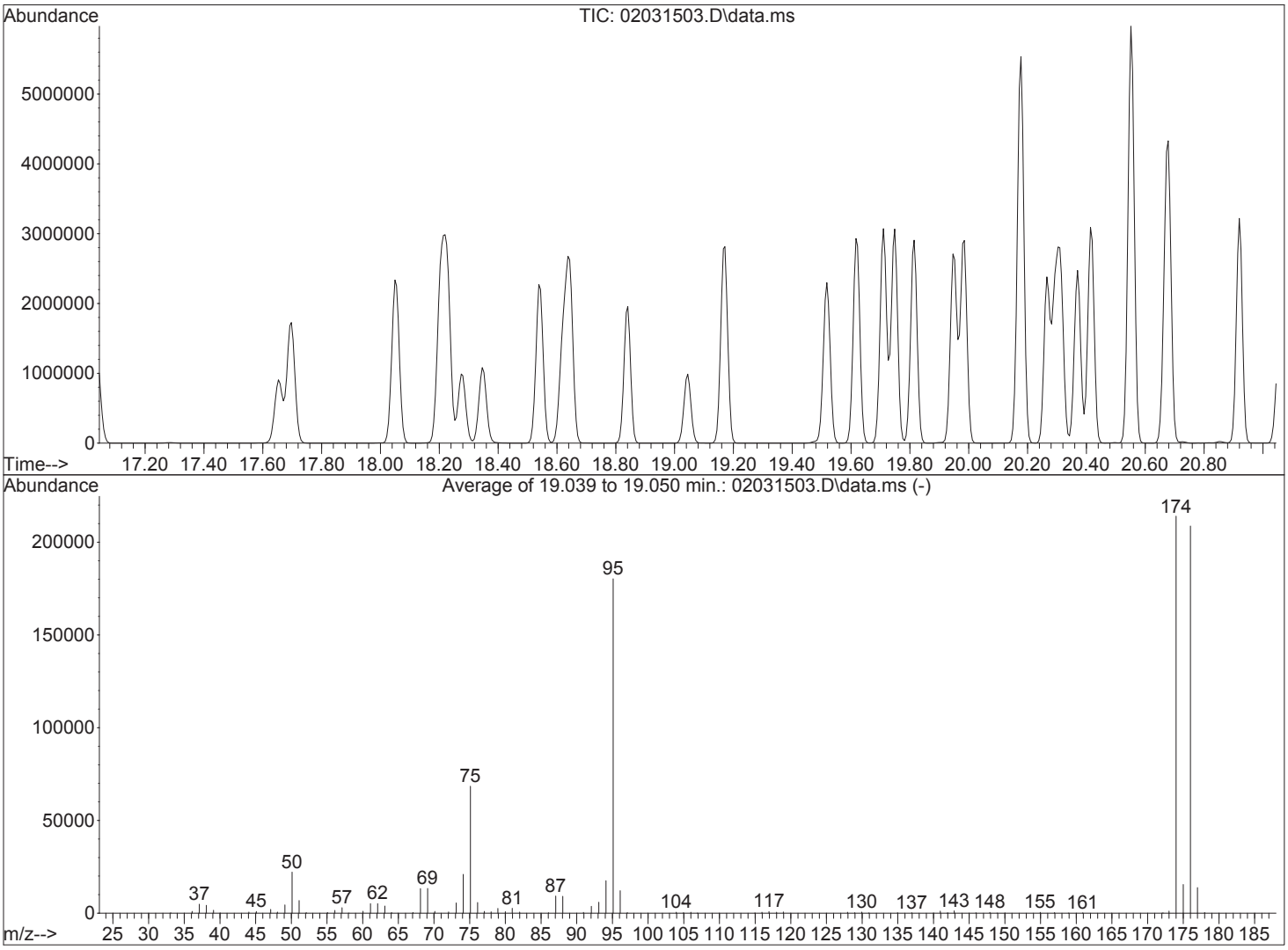
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	12.5	20347	PASS
75	95	30	66	37.6	61291	PASS
95	95	100	100	100.0	162837	PASS
96	95	5	9	6.6	10758	PASS
173	174	0.00	2	0.9	1714	PASS
174	95	50	120	118.5	193003	PASS
175	174	4	9	7.2	13878	PASS
176	174	93	101	97.4	187989	PASS
177	176	5	9	6.5	12310	PASS

LH 2/3/15

Data Path : I:\MS16\DATA\2015_02\03\
Data File : 02031503.D
Acq On : 3 Feb 2015 2:11
Operator : LH
Sample : CCV R16020315_25ng
Misc : S29-01071501/S29-01081503 (2/6)
ALS Vial : 1 Sample Multiplier: 1

Integration File: RTEINT.P

Method : I:\MS16\METHODS\R16112414.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Nov 25 09:22:10 2014



AutoFind: Scans 2810, 2811, 2812 Background Corrected with Scan 2801

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	12.3	22144	PASS
75	95	30	66	38.0	68429	PASS
95	95	100	100	100.0	180267	PASS
96	95	5	9	6.7	12147	PASS
173	174	0.00	2	0.5	1168	PASS
174	95	50	120	118.7	214016	PASS
175	174	4	9	7.2	15490	PASS
176	174	93	101	97.5	208704	PASS
177	176	5	9	6.6	13820	PASS

LH 2/3/15

21	11/5/14 1:12	11041421.D	12.5ng TO-15 BFB	S29-10091401	LH	2	passed
22	11/5/14 1:45	11041422.D	0.4ng TO-15 Custom ICAL STD	S29-10091401/S29-11041406 (12/3)	LH	7	
23	11/5/14 2:19	11041423.D	1.0ng TO-15 Custom ICAL STD	S29-10091401/S29-11041406 (12/3)	LH	7	
24	11/5/14 2:53	11041424.D	2.5ng TO-15 Custom ICAL STD	S29-10091401/S29-11041406 (12/3)	LH	7	
25	11/5/14 3:28	11041425.D	5.0ng TO-15 Custom ICAL STD	S29-10091401/S29-11041406 (12/3)	LH	7	
26	11/5/14 4:02	11041426.D	25ng TO-15 Custom ICAL STD	S29-10091401/S29-11041403 (12/3)	LH	3	ACF16110414.M
27	11/5/14 4:36	11041427.D	50ng TO-15 Custom ICAL STD	S29-10091401/S29-11041403 (12/3)	LH	3	
28	11/5/14 5:10	11041428.D	100ng TO-15 Custom ICAL STD	S29-10091401/S29-11041403 (12/3)	LH	3	
29	11/5/14 5:45	11041429.D	25ng TO-15 Custom ICV STD	S29-10091401/S29-10141406 (11/12)	LH	10	passed
30	11/5/14 9:17	11041430.D	1.0ng TO-15 ICAL STD	S29-10091401/S29-11041414 (12/3)	LH	1	
31	11/5/14 9:51	11041431.D	5.0ng TO-15 ICAL STD	S29-10091401/S29-11041414 (12/3)	LH	1	
32	11/5/14 10:25	11041432.D	25ng TO-15 ICV STD	S29-10091401/S29-10221402 (11/21)	LH	1	
33	11/5/14 12:04	11041433.D	Blank (200ml)	S29-10091401	LH	2	
34	11/5/14 12:46	11041434.D	Blank (200ml)	S29-10091401	LH	2	
35	11/5/14 13:42	11041435.D	Blank (200ml)	S29-10091401	LH	2	
36	11/5/14 14:16	11041436.D	Blank (200ml)	S29-10091401	LH	2	

11/6/14

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
10	11/24/14 15:14	11241410.D	5.0ng STD check	S29-11141401/S29-11201407 (12/19)	LH	7	
11	11/24/14 15:48	11241411.D	25ng STD check	S29-11141401/S29-11201403 (12/19)	LH	1	
12	11/24/14 16:22	11241412.D	12.5ng TO-15 BFB	S29-11141401	LH	2	passed
13	11/24/14 16:56	11241413.D	0.08ng TO-15 ICAL STD	S29-11141401/S29-10281402 (11/26)	LH	6	
14	11/24/14 17:30	11241414.D	0.1ng TO-15 ICAL STD	S29-11141401/S29-10281402 (11/26)	LH	6	
15	11/24/14 18:04	11241415.D	0.2ng TO-15 ICAL STD	S29-11141401/S29-10281402 (11/26)	LH	6	case file
16	11/24/14 18:39	11241416.D	0.4ng TO-15 ICAL STD	S29-11141401/S29-10281402 (11/26)	LH	6	case file
17	11/24/14 19:13	11241417.D	1.0ng TO-15 ICAL STD	S29-11141401/S29-11201407 (12/19)	LH	7	
18	11/24/14 19:47	11241418.D	5.0ng TO-15 ICAL STD	S29-11141401/S29-11201407 (12/19)	LH	7	
19	11/24/14 20:21	11241419.D	25ng TO-15 ICAL STD	S29-11141401/S29-11201403 (12/19)	LH	1	**R16112414.M**
20	11/24/14 20:55	11241420.D	50ng TO-15 ICAL STD	S29-11141401/S29-11201403 (12/19)	LH	1	
21	11/24/14 21:29	11241421.D	100ng TO-15 ICAL STD	S29-11141401/S29-11201403 (12/19)	LH	1	
22	11/24/14 22:04	11241422.D	25ng TO-15 ICV STD	S29-11141401/S29-11241401 (12/23)	LH	1	case file
23	11/24/14 22:38	11241423.D	12.5ng TO-15 BFB	S29-11141401	LH	2	passed
24	11/24/14 23:11	11241424.D	0.5ng MAPH ICAL STD	S29-11141401/S29-11211406 (1/19)	LH	5	
25	11/24/14 23:45	11241425.D	1.0ng MAPH ICAL STD	S29-11141401/S29-11211406 (1/19)	LH	5	
26	11/25/14 0:20	11241426.D	5.0ng MAPH ICAL STD	S29-11141401/S29-11211406 (1/19)	LH	5	
27	11/25/14 0:54	11241427.D	25ng MAPH ICAL STD	S29-11141401/S29-11211405 (1/19)	LH	4	**M16112414.M**
28	11/25/14 1:28	11241428.D	50ng MAPH ICAL STD	S29-11141401/S29-11211405 (1/19)	LH	4	
29	11/25/14 2:02	11241429.D	100ng MAPH ICAL STD	S29-11141401/S29-11211405 (1/19)	LH	4	
30	11/25/14 2:37	11241430.D	25ng MAPH ICV STD	S29-11141401/S29-11241401 (12/23)	LH	1	passed
31	11/25/14 7:56	11241431.D	0.2ng TO-15 ICAL STD	S29-11141401/S29-11201408 (12/19)	LH	9	
32	11/25/14 8:30	11241432.D	0.4ng TO-15 ICAL STD	S29-11141401/S29-11201408 (12/19)	LH	9	
33	11/25/14 9:04	11241433.D	25ng TO-15 ICV STD	S29-11141401/S29-11241401 (12/23)	LH	1	passed

> 5HD CMW

ICAL R16112414.M passed for all compounds 0.08ng-100ng, except: Ethanol, Acetone 1.0ng-500ng, Methylene chloride, 2-Hexanone, 1.2,4-Trichlorobenzene, Naphthalene, Cyclohexanone 0.4ng-100ng, Carbon Disulfide, 2-Butanone 0.2ng-100ng, 1-Butanol 0.2ng-200ng, n-Butyl acetate, n-Dodecane 0.1ng-100ng.

LH 11/25/14

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	2/3/15 1:03	02031501.D	CCV ACF16020315_25ng	S29-01071501/S29-01291502 (2/27)	LH	3	passed
2	2/3/15 1:37	02031502.D	CCV M16020315_25ng	S29-01071501/S29-01271502 (3/26)	LH	4	passed
3	2/3/15 2:11	02031503.D	CCV R16020315_25ng	S29-01071501/S29-01081503 (2/6)	LH	1	passed
4	2/3/15 2:47	02031504.D	MB R16020315_1000mL	S29-01071501	LH	2	passed
5	2/3/15 3:21	02031505.D	LCS R16020315_25ng	S29-01071501/S29-01291507 (2/27)	LH	1	passed
6	2/3/15 3:55	02031506.D	LCSD R16020315_25ng	S29-01071501/S29-01291507 (2/27)	LH	1	passed
7	2/3/15 7:00	02031507.D	P1500320-016 dil (60mL)	S29-01071501	LH	12	
8	2/3/15 7:34	02031508.D	P1500341-001 (2.0mL)	S29-01071501	LH	1	overdiluted
9	2/3/15 8:08	02031509.D	P1500341-001 (8.0mL)	S29-01071501	LH	1	
10	2/3/15 8:46	02031510.D	P1500341-002 (8.0mL)	S29-01071501	LH	1	
11	2/3/15 9:21	02031511.D	P1500341-002 dil (2.0mL)	S29-01071501	LH	1	
12	2/3/15 10:02	02031512.D	P1500300-001 (10mL)	S29-01071501	LH	1	overdiluted
13	2/3/15 10:38	02031513.D	P1500300-001 (20mL)	S29-01071501	LH	5	not used
14	2/3/15 11:14	02031514.D	P1500300-001 (15mL)	S29-01071501	LH	1	
15	2/3/15 11:59	02031515.D	P1500300-002 (20mL)	S29-01071501	LH	1	
16	2/3/15 12:33	02031516.D	P1500399-001 (0.05mL)	S29-01071501	LH	1	
17	2/3/15 13:07	02031517.D	P1500399-002 (0.04mL)	S29-01071501	LH	1	
18	2/3/15 13:41	02031518.D	P1500399-003 (0.05mL)	S29-01071501	LH	1	
19	2/3/15 14:15	02031519.D	P1500399-004 (0.04mL)	S29-01071501	LH	1	
20	2/3/15 15:07	02031520.D	P1500399-005 (0.06mL)	S29-01071501	LH	1	
21	2/3/15 15:41	02031521.D	P1500399-006 (0.04mL)	S29-01071501	LH	1	
22	2/3/15 16:15	02031522.D	P1500399-007 (0.03mL)	S29-01071501	LH	1	
23	2/3/15 16:50	02031523.D	P1500399-008 (0.04mL)	S29-01071501	LH	1	
24	2/3/15 17:24	02031524.D	Blank (100mL)	S29-01071501	LH	2	
25	2/3/15 17:59	02031525.D	P1500308-001 (1000mL)	S29-01071501	LH	5	
26	2/3/15 18:35	02031526.D	P1500308-002 (1000mL)	S29-01071501	LH	6	
27	2/3/15 19:10	02031527.D	P1500308-002 dup (1000mL)	S29-01071501	LH	6	passed
28	2/3/15 19:45	02031528.D	CCV2 ACF16020315_25ng	S29-01071501/S29-01291502 (2/27)	LH	3	passed
29	2/3/15 20:19	02031529.D	CCV2 R16020315_25ng	S29-01071501/S29-01081503 (2/6)	LH	1	passed
30	2/3/15 20:54	02031530.D	MB2 R16020315_1000mL	S29-01071501	LH	2	passed
31	2/3/15 21:28	02031531.D	LCS2 R16020315_25ng	S29-01071501/S29-01291507 (2/27)	LH	1	passed
32	2/3/15 22:03	02031532.D	LCSD2 R16020315_25ng	S29-01071501/S29-01291507 (2/27)	LH	1	passed
33	2/3/15 22:37	02031533.D	P1500349-005 (400mL)	S29-01071501	LH	7	
34	2/3/15 23:11	02031534.D	P1500349-006 (400mL)	S29-01071501	LH	8	
35	2/3/15 23:45	02031535.D	P1500349-007 (400mL)	S29-01071501	LH	9	
36	2/4/15 0:19	02031536.D	P1500349-008 (400mL)	S29-01071501	LH	10	
37	2/4/15 0:54	02031537.D	P1500345-001 (1000mL)	S29-01071501	LH	11	
38	2/4/15 1:30	02031538.D	P1500345-002 (1000mL)	S29-01071501	LH	12	
39	2/4/15 2:05	02031539.D	P1500345-002 dup (1000mL)	S29-01071501	LH	12	passed
40	2/4/15 2:41	02031540.D	P1500345-003 (1000mL)	S29-01071501	LH	13	
41	2/4/15 3:16	02031541.D	P1500345-004 (1000mL)	1 of 1S29-01071501	LH	14	2/5/15 10:01 AM

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LABORATORY REPORT

February 19, 2015

Chris Pike
Tetra Tech NUS, Inc.
661 Anderson Drive, Foster Plaza 7
Pittsburgh, PA 15220

RE: LC39A GW Interim Measure / 112G06925

Dear: Chris

Enclosed are the results of the samples submitted to our laboratory on January 30, 2015. For your reference, these analyses have been assigned our service request number P1500369.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental



Kate Aguilera
Project Manager

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Client: Tetra Tech NUS, Inc. Service Request No: P1500369
Project: LC39A GW Interim Measure / 112G06925

CASE NARRATIVE

The samples were received intact under chain of custody on January 30, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is not included on the laboratory's AIHA-LAP scope of accreditation. Any analytes flagged with an X are not included on the laboratory's NELAP or DoD-ELAP scope of accreditation.

The Summa canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	838341
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-14-5
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272014-4
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Tetra Tech NUS, Inc. Service Request: P1500369

Project ID: LC39A GW Interim Measure / 112G06925

Date Received: 1/30/2015

Time Received: 10:00

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pfl (psig)	TO-15 - VOC Cans
LC39A-AIR-Startup D2-20150126	P1500369-001	Air	1/26/2015	16:11	AS00781	-1.90	3.78	X
LC39A-AIR-Startup D3-20150127	P1500369-002	Air	1/27/2015	16:00	AS00413	-2.25	3.54	X
LC39A-AIR-Startup D4-20150128	P1500369-003	Air	1/28/2015	16:12	AC01299	-0.35	3.62	X
LC39A-AIR-Startup D5-20150129	P1500369-004	Air	1/29/2015	16:07	AC00982	-1.54	3.74	X

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

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Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: P1500369

Company Name & Address (Reporting Information): Tetra Tech

Project Name: LC39A GW Interim Measure

Project Number: 112G06925

Project Manager: Chris Pike

P.O. # / Billing Information

Phone: 412-921-7090 Fax:

Email Address for Result Reporting: Chris.Pike@TetraTech.com

Sampler (Print & Sign): Jeff Rapilti

ALS Contact:

Analysis Method: TO15 Client List

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume		Comments e.g. Actual Preservative or specific instructions
LC39A-AIR-StartupD2-20150126		1/26/2015	0811-1611	AS00781	FCA00265	>-30	-6	6L	✓	
LC39A-AIR-StartupD3-20150127		1/27/2015	0800-1600	AS00413	FCA00760	-30	-6	6L	✓	
LC39A-AIR-StartupD4-20150128		1/28/2015	812-1612	AC01299	FCA00618	-29	-2	6L	✓	
LC39A-AIR-StartupD5-20150129		1/29/2015	807-1607	AC00982	FCA00643	~~-25~~ -25	-4.5	6L	✓	

5 of 175

Report Tier Levels - please select

Tier I - Results (Default in not specified) _____
Tier II (Results + QC Summaries _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Date Validation Package) 10% Surcharge _____

EDD required YES / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
FEDEX	1/29/2015	1700	FEDEX	1/29/15	1700
	Date:	Time:	Received by: (Signature)	Date: 1/30/15	Time: 1000

Cooler / Blank Temperature _____°C

ALS Environmental
Sample Acceptance Check Form

Client: Tetra Tech NUS, Inc. Work order: P1500369

Project: LC39A GW Interim Measure / 112G06925

Sample(s) received on: 1/30/15 Date opened: 1/30/15 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by ALS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1500369-001.01	6.0 L Silonite Can					
P1500369-002.01	6.0 L Silonite Can					
P1500369-003.01	6.0 L Ambient Can					
P1500369-004.01	6.0 L Ambient Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D2-20150126**
Client Project ID: **LC39A GW Interim Measure / 112G06925**

ALS Project ID: P1500369
ALS Sample ID: P1500369-001

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00781

Date Collected: 1/26/15
Date Received: 1/30/15
Date Analyzed: 2/13/15
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -1.90 Final Pressure (psig): 3.78

Canister Dilution Factor: 1.44

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	**1.9**	0.72	0.24	**0.38**	0.15	0.050	
74-87-3	Chloromethane	**0.29**	0.72	0.22	**0.14**	0.35	0.10	**J**
75-01-4	Vinyl Chloride	ND	0.72	0.24	ND	0.28	0.096	
74-83-9	Bromomethane	ND	0.72	0.27	ND	0.19	0.070	
75-00-3	Chloroethane	ND	0.72	0.24	ND	0.27	0.093	
67-64-1	Acetone	**4.7**	7.2	1.1	**2.0**	3.0	0.47	**J**
75-69-4	Trichlorofluoromethane	**1.1**	0.72	0.24	**0.19**	0.13	0.044	
75-35-4	1,1-Dichloroethene	ND	0.72	0.24	ND	0.18	0.062	
75-09-2	Methylene Chloride	**0.31**	0.72	0.24	**0.090**	0.21	0.070	**J**
76-13-1	Trichlorotrifluoroethane	**64**	0.72	0.24	**8.3**	0.094	0.032	
75-15-0	Carbon Disulfide	ND	7.2	0.22	ND	2.3	0.069	
156-60-5	trans-1,2-Dichloroethene	ND	0.72	0.27	ND	0.18	0.069	
75-34-3	1,1-Dichloroethane	ND	0.72	0.23	ND	0.18	0.057	
1634-04-4	Methyl tert-Butyl Ether	ND	0.72	0.24	ND	0.20	0.068	
78-93-3	2-Butanone (MEK)	**1.3**	7.2	0.30	**0.44**	2.4	0.10	**J**
156-59-2	cis-1,2-Dichloroethene	ND	0.72	0.23	ND	0.18	0.058	
67-66-3	Chloroform	ND	0.72	0.24	ND	0.15	0.050	
107-06-2	1,2-Dichloroethane	ND	0.72	0.23	ND	0.18	0.057	
71-55-6	1,1,1-Trichloroethane	ND	0.72	0.24	ND	0.13	0.045	
71-43-2	Benzene	**1.1**	0.72	0.23	**0.35**	0.23	0.072	
56-23-5	Carbon Tetrachloride	**0.40**	0.72	0.22	**0.063**	0.11	0.034	**J**
110-82-7	Cyclohexane	ND	1.4	0.42	ND	0.42	0.12	
78-87-5	1,2-Dichloropropane	ND	0.72	0.23	ND	0.16	0.050	
75-27-4	Bromodichloromethane	ND	0.72	0.22	ND	0.11	0.032	
79-01-6	Trichloroethene	ND	0.72	0.20	ND	0.13	0.038	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D2-20150126** ALS Project ID: P1500369
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P1500369-001

Test Code: EPA TO-15 Date Collected: 1/26/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 1/30/15
Analyst: Simon Cao Date Analyzed: 2/13/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00781

Initial Pressure (psig): -1.90 Final Pressure (psig): 3.78

Canister Dilution Factor: 1.44

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	0.72	0.20	ND	0.16	0.044	
108-10-1	4-Methyl-2-pentanone	ND	0.72	0.23	ND	0.18	0.056	
10061-02-6	trans-1,3-Dichloropropene	ND	0.72	0.23	ND	0.16	0.051	
79-00-5	1,1,2-Trichloroethane	ND	0.72	0.23	ND	0.13	0.042	
108-88-3	Toluene	ND	0.72	0.24	ND	0.19	0.065	
591-78-6	2-Hexanone	ND	0.72	0.23	ND	0.18	0.056	
124-48-1	Dibromochloromethane	ND	0.72	0.23	ND	0.085	0.027	
106-93-4	1,2-Dibromoethane	ND	0.72	0.23	ND	0.094	0.030	
127-18-4	Tetrachloroethene	ND	0.72	0.20	ND	0.11	0.030	
108-90-7	Chlorobenzene	ND	0.72	0.23	ND	0.16	0.050	
100-41-4	Ethylbenzene	ND	0.72	0.23	ND	0.17	0.053	
179601-23-1	m,p-Xylenes	ND	1.4	0.43	ND	0.33	0.099	
75-25-2	Bromoform	ND	0.72	0.22	ND	0.070	0.021	
100-42-5	Styrene	ND	0.72	0.22	ND	0.17	0.051	
95-47-6	o-Xylene	ND	0.72	0.22	ND	0.17	0.050	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.72	0.22	ND	0.10	0.031	
98-82-8	Cumene	ND	0.72	0.22	ND	0.15	0.044	
541-73-1	1,3-Dichlorobenzene	ND	0.72	0.22	ND	0.12	0.036	
106-46-7	1,4-Dichlorobenzene	ND	0.72	0.20	ND	0.12	0.034	
95-50-1	1,2-Dichlorobenzene	ND	0.72	0.22	ND	0.12	0.036	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.72	0.14	ND	0.075	0.015	
120-82-1	1,2,4-Trichlorobenzene	ND	0.72	0.23	ND	0.097	0.031	
79-20-9	Methyl Acetate	ND	0.72	0.35	ND	0.24	0.11	**X**
108-87-2	Methylcyclohexane	ND	0.72	0.37	ND	0.18	0.093	**X**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
X = See case narrative.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D3-20150127**
Client Project ID: **LC39A GW Interim Measure / 112G06925**

ALS Project ID: P1500369
ALS Sample ID: P1500369-002

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00413

Date Collected: 1/27/15
Date Received: 1/30/15
Date Analyzed: 2/13/15
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -2.25 Final Pressure (psig): 3.54

Canister Dilution Factor: 1.47

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	**1.9**	0.74	0.25	**0.39**	0.15	0.051	
74-87-3	Chloromethane	**0.29**	0.74	0.22	**0.14**	0.36	0.11	**J**
75-01-4	Vinyl Chloride	ND	0.74	0.25	ND	0.29	0.098	
74-83-9	Bromomethane	ND	0.74	0.28	ND	0.19	0.072	
75-00-3	Chloroethane	ND	0.74	0.25	ND	0.28	0.095	
67-64-1	Acetone	**3.8**	7.4	1.1	**1.6**	3.1	0.48	**J**
75-69-4	Trichlorofluoromethane	**1.1**	0.74	0.25	**0.19**	0.13	0.044	
75-35-4	1,1-Dichloroethene	ND	0.74	0.25	ND	0.19	0.063	
75-09-2	Methylene Chloride	**0.34**	0.74	0.25	**0.099**	0.21	0.072	**J**
76-13-1	Trichlorotrifluoroethane	**47**	0.74	0.25	**6.2**	0.096	0.033	
75-15-0	Carbon Disulfide	ND	7.4	0.22	ND	2.4	0.071	
156-60-5	trans-1,2-Dichloroethene	ND	0.74	0.28	ND	0.19	0.070	
75-34-3	1,1-Dichloroethane	ND	0.74	0.24	ND	0.18	0.058	
1634-04-4	Methyl tert-Butyl Ether	ND	0.74	0.25	ND	0.20	0.069	
78-93-3	2-Butanone (MEK)	**0.66**	7.4	0.31	**0.22**	2.5	0.10	**J**
156-59-2	cis-1,2-Dichloroethene	ND	0.74	0.24	ND	0.19	0.059	
67-66-3	Chloroform	ND	0.74	0.25	ND	0.15	0.051	
107-06-2	1,2-Dichloroethane	ND	0.74	0.24	ND	0.18	0.058	
71-55-6	1,1,1-Trichloroethane	ND	0.74	0.25	ND	0.13	0.046	
71-43-2	Benzene	**0.34**	0.74	0.24	**0.11**	0.23	0.074	**J**
56-23-5	Carbon Tetrachloride	**0.41**	0.74	0.22	**0.065**	0.12	0.035	**J**
110-82-7	Cyclohexane	ND	1.5	0.43	ND	0.43	0.12	
78-87-5	1,2-Dichloropropane	ND	0.74	0.24	ND	0.16	0.051	
75-27-4	Bromodichloromethane	ND	0.74	0.22	ND	0.11	0.033	
79-01-6	Trichloroethene	ND	0.74	0.21	ND	0.14	0.038	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D3-20150127** ALS Project ID: P1500369
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P1500369-002

Test Code: EPA TO-15 Date Collected: 1/27/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 1/30/15
Analyst: Simon Cao Date Analyzed: 2/13/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00413

Initial Pressure (psig): -2.25 Final Pressure (psig): 3.54

Canister Dilution Factor: 1.47

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	0.74	0.21	ND	0.16	0.045	
108-10-1	4-Methyl-2-pentanone	ND	0.74	0.24	ND	0.18	0.057	
10061-02-6	trans-1,3-Dichloropropene	ND	0.74	0.24	ND	0.16	0.052	
79-00-5	1,1,2-Trichloroethane	ND	0.74	0.24	ND	0.13	0.043	
108-88-3	Toluene	**0.38**	0.74	0.25	**0.10**	0.20	0.066	**J**
591-78-6	2-Hexanone	ND	0.74	0.24	ND	0.18	0.057	
124-48-1	Dibromochloromethane	ND	0.74	0.24	ND	0.086	0.028	
106-93-4	1,2-Dibromoethane	ND	0.74	0.24	ND	0.096	0.031	
127-18-4	Tetrachloroethene	ND	0.74	0.21	ND	0.11	0.030	
108-90-7	Chlorobenzene	ND	0.74	0.24	ND	0.16	0.051	
100-41-4	Ethylbenzene	ND	0.74	0.24	ND	0.17	0.054	
179601-23-1	m,p-Xylenes	ND	1.5	0.44	ND	0.34	0.10	
75-25-2	Bromoform	ND	0.74	0.22	ND	0.071	0.021	
100-42-5	Styrene	ND	0.74	0.22	ND	0.17	0.052	
95-47-6	o-Xylene	ND	0.74	0.22	ND	0.17	0.051	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.74	0.22	ND	0.11	0.032	
98-82-8	Cumene	ND	0.74	0.22	ND	0.15	0.045	
541-73-1	1,3-Dichlorobenzene	ND	0.74	0.22	ND	0.12	0.037	
106-46-7	1,4-Dichlorobenzene	ND	0.74	0.21	ND	0.12	0.034	
95-50-1	1,2-Dichlorobenzene	ND	0.74	0.22	ND	0.12	0.037	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.74	0.15	ND	0.076	0.015	
120-82-1	1,2,4-Trichlorobenzene	ND	0.74	0.24	ND	0.099	0.032	
79-20-9	Methyl Acetate	ND	0.74	0.35	ND	0.24	0.12	**X**
108-87-2	Methylcyclohexane	ND	0.74	0.38	ND	0.18	0.095	**X**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
X = See case narrative.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D4-20150128**
Client Project ID: **LC39A GW Interim Measure / 112G06925**

ALS Project ID: P1500369
ALS Sample ID: P1500369-003

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01299

Date Collected: 1/28/15
Date Received: 1/30/15
Date Analyzed: 2/13/15
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -0.35 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.28

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	**1.9**	0.64	0.22	**0.39**	0.13	0.044	
74-87-3	Chloromethane	**0.35**	0.64	0.19	**0.17**	0.31	0.093	**J**
75-01-4	Vinyl Chloride	ND	0.64	0.22	ND	0.25	0.085	
74-83-9	Bromomethane	ND	0.64	0.24	ND	0.16	0.063	
75-00-3	Chloroethane	ND	0.64	0.22	ND	0.24	0.082	
67-64-1	Acetone	**4.5**	6.4	0.99	**1.9**	2.7	0.42	**J**
75-69-4	Trichlorofluoromethane	**1.1**	0.64	0.22	**0.19**	0.11	0.039	
75-35-4	1,1-Dichloroethene	ND	0.64	0.22	ND	0.16	0.055	
75-09-2	Methylene Chloride	**0.30**	0.64	0.22	**0.088**	0.18	0.063	**J**
76-13-1	Trichlorotrifluoroethane	**1.3**	0.64	0.22	**0.17**	0.084	0.028	
75-15-0	Carbon Disulfide	**0.19**	6.4	0.19	**0.063**	2.1	0.062	**J**
156-60-5	trans-1,2-Dichloroethene	ND	0.64	0.24	ND	0.16	0.061	
75-34-3	1,1-Dichloroethane	ND	0.64	0.20	ND	0.16	0.051	
1634-04-4	Methyl tert-Butyl Ether	ND	0.64	0.22	ND	0.18	0.060	
78-93-3	2-Butanone (MEK)	**0.73**	6.4	0.27	**0.25**	2.2	0.091	**J**
156-59-2	cis-1,2-Dichloroethene	ND	0.64	0.20	ND	0.16	0.052	
67-66-3	Chloroform	ND	0.64	0.22	ND	0.13	0.045	
107-06-2	1,2-Dichloroethane	ND	0.64	0.20	ND	0.16	0.051	
71-55-6	1,1,1-Trichloroethane	ND	0.64	0.22	ND	0.12	0.040	
71-43-2	Benzene	**0.32**	0.64	0.20	**0.10**	0.20	0.064	**J**
56-23-5	Carbon Tetrachloride	**0.41**	0.64	0.19	**0.065**	0.10	0.031	**J**
110-82-7	Cyclohexane	ND	1.3	0.37	ND	0.37	0.11	
78-87-5	1,2-Dichloropropane	ND	0.64	0.20	ND	0.14	0.044	
75-27-4	Bromodichloromethane	ND	0.64	0.19	ND	0.096	0.029	
79-01-6	Trichloroethene	ND	0.64	0.18	ND	0.12	0.033	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D4-20150128** ALS Project ID: P1500369
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P1500369-003

Test Code: EPA TO-15 Date Collected: 1/28/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 1/30/15
Analyst: Simon Cao Date Analyzed: 2/13/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01299

Initial Pressure (psig): -0.35 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.28

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	0.64	0.18	ND	0.14	0.039	
108-10-1	4-Methyl-2-pentanone	ND	0.64	0.20	ND	0.16	0.050	
10061-02-6	trans-1,3-Dichloropropene	ND	0.64	0.20	ND	0.14	0.045	
79-00-5	1,1,2-Trichloroethane	ND	0.64	0.20	ND	0.12	0.038	
108-88-3	Toluene	**0.39**	0.64	0.22	**0.10**	0.17	0.058	**J**
591-78-6	2-Hexanone	ND	0.64	0.20	ND	0.16	0.050	
124-48-1	Dibromochloromethane	ND	0.64	0.20	ND	0.075	0.024	
106-93-4	1,2-Dibromoethane	ND	0.64	0.20	ND	0.083	0.027	
127-18-4	Tetrachloroethene	ND	0.64	0.18	ND	0.094	0.026	
108-90-7	Chlorobenzene	ND	0.64	0.20	ND	0.14	0.044	
100-41-4	Ethylbenzene	ND	0.64	0.20	ND	0.15	0.047	
179601-23-1	m,p-Xylenes	ND	1.3	0.38	ND	0.29	0.088	
75-25-2	Bromoform	ND	0.64	0.19	ND	0.062	0.019	
100-42-5	Styrene	ND	0.64	0.19	ND	0.15	0.045	
95-47-6	o-Xylene	ND	0.64	0.19	ND	0.15	0.044	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.64	0.19	ND	0.093	0.028	
98-82-8	Cumene	ND	0.64	0.19	ND	0.13	0.039	
541-73-1	1,3-Dichlorobenzene	ND	0.64	0.19	ND	0.11	0.032	
106-46-7	1,4-Dichlorobenzene	ND	0.64	0.18	ND	0.11	0.030	
95-50-1	1,2-Dichlorobenzene	ND	0.64	0.19	ND	0.11	0.032	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.64	0.13	ND	0.066	0.013	
120-82-1	1,2,4-Trichlorobenzene	ND	0.64	0.20	ND	0.086	0.028	
79-20-9	Methyl Acetate	ND	0.64	0.31	ND	0.21	0.10	**X**
108-87-2	Methylcyclohexane	ND	0.64	0.33	ND	0.16	0.083	**X**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
X = See case narrative.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D5-20150129**
Client Project ID: **LC39A GW Interim Measure / 112G06925**

ALS Project ID: P1500369
ALS Sample ID: P1500369-004

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC00982

Date Collected: 1/29/15
Date Received: 1/30/15
Date Analyzed: 2/13/15
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -1.54 Final Pressure (psig): 3.74

Canister Dilution Factor: 1.40

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	**1.9**	0.70	0.24	**0.38**	0.14	0.048	
74-87-3	Chloromethane	**0.26**	0.70	0.21	**0.13**	0.34	0.10	**J**
75-01-4	Vinyl Chloride	ND	0.70	0.24	ND	0.27	0.093	
74-83-9	Bromomethane	ND	0.70	0.27	ND	0.18	0.069	
75-00-3	Chloroethane	ND	0.70	0.24	ND	0.27	0.090	
67-64-1	Acetone	**15**	7.0	1.1	**6.4**	2.9	0.45	
75-69-4	Trichlorofluoromethane	**1.1**	0.70	0.24	**0.19**	0.12	0.042	
75-35-4	1,1-Dichloroethene	ND	0.70	0.24	ND	0.18	0.060	
75-09-2	Methylene Chloride	**0.35**	0.70	0.24	**0.10**	0.20	0.069	**J**
76-13-1	Trichlorotrifluoroethane	**2.7**	0.70	0.24	**0.36**	0.091	0.031	
75-15-0	Carbon Disulfide	ND	7.0	0.21	ND	2.2	0.067	
156-60-5	trans-1,2-Dichloroethene	ND	0.70	0.27	ND	0.18	0.067	
75-34-3	1,1-Dichloroethane	ND	0.70	0.22	ND	0.17	0.055	
1634-04-4	Methyl tert-Butyl Ether	ND	0.70	0.24	ND	0.19	0.066	
78-93-3	2-Butanone (MEK)	**1.9**	7.0	0.29	**0.65**	2.4	0.10	**J**
156-59-2	cis-1,2-Dichloroethene	ND	0.70	0.22	ND	0.18	0.057	
67-66-3	Chloroform	ND	0.70	0.24	ND	0.14	0.049	
107-06-2	1,2-Dichloroethane	ND	0.70	0.22	ND	0.17	0.055	
71-55-6	1,1,1-Trichloroethane	ND	0.70	0.24	ND	0.13	0.044	
71-43-2	Benzene	**0.34**	0.70	0.22	**0.11**	0.22	0.070	**J**
56-23-5	Carbon Tetrachloride	**0.38**	0.70	0.21	**0.060**	0.11	0.033	**J**
110-82-7	Cyclohexane	ND	1.4	0.41	ND	0.41	0.12	
78-87-5	1,2-Dichloropropane	ND	0.70	0.22	ND	0.15	0.048	
75-27-4	Bromodichloromethane	ND	0.70	0.21	ND	0.10	0.031	
79-01-6	Trichloroethene	**0.20**	0.70	0.20	**0.038**	0.13	0.036	**J**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **LC39A-AIR-Startup D5-20150129** ALS Project ID: P1500369
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P1500369-004

Test Code: EPA TO-15 Date Collected: 1/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 1/30/15
Analyst: Simon Cao Date Analyzed: 2/13/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00982

Initial Pressure (psig): -1.54 Final Pressure (psig): 3.74

Canister Dilution Factor: 1.40

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	0.70	0.20	ND	0.15	0.043	
108-10-1	4-Methyl-2-pentanone	**0.23**	0.70	0.22	**0.057**	0.17	0.055	**J**
10061-02-6	trans-1,3-Dichloropropene	ND	0.70	0.22	ND	0.15	0.049	
79-00-5	1,1,2-Trichloroethane	ND	0.70	0.22	ND	0.13	0.041	
108-88-3	Toluene	**0.32**	0.70	0.24	**0.084**	0.19	0.063	**J**
591-78-6	2-Hexanone	**0.46**	0.70	0.22	**0.11**	0.17	0.055	**J**
124-48-1	Dibromochloromethane	ND	0.70	0.22	ND	0.082	0.026	
106-93-4	1,2-Dibromoethane	ND	0.70	0.22	ND	0.091	0.029	
127-18-4	Tetrachloroethene	ND	0.70	0.20	ND	0.10	0.029	
108-90-7	Chlorobenzene	ND	0.70	0.22	ND	0.15	0.049	
100-41-4	Ethylbenzene	ND	0.70	0.22	ND	0.16	0.052	
179601-23-1	m,p-Xylenes	ND	1.4	0.42	ND	0.32	0.097	
75-25-2	Bromoform	ND	0.70	0.21	ND	0.068	0.020	
100-42-5	Styrene	**0.41**	0.70	0.21	**0.096**	0.16	0.049	**J**
95-47-6	o-Xylene	ND	0.70	0.21	ND	0.16	0.048	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.70	0.21	ND	0.10	0.031	
98-82-8	Cumene	ND	0.70	0.21	ND	0.14	0.043	
541-73-1	1,3-Dichlorobenzene	ND	0.70	0.21	ND	0.12	0.035	
106-46-7	1,4-Dichlorobenzene	ND	0.70	0.20	ND	0.12	0.033	
95-50-1	1,2-Dichlorobenzene	ND	0.70	0.21	ND	0.12	0.035	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.70	0.14	ND	0.072	0.014	
120-82-1	1,2,4-Trichlorobenzene	ND	0.70	0.22	ND	0.094	0.030	
79-20-9	Methyl Acetate	ND	0.70	0.34	ND	0.23	0.11	**X**
108-87-2	Methylcyclohexane	ND	0.70	0.36	ND	0.17	0.091	**X**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
X = See case narrative.

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P1500369
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P150213-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 2/13/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	0.17	ND	0.10	0.034	
74-87-3	Chloromethane	ND	0.50	0.15	ND	0.24	0.073	
75-01-4	Vinyl Chloride	ND	0.50	0.17	ND	0.20	0.067	
74-83-9	Bromomethane	ND	0.50	0.19	ND	0.13	0.049	
75-00-3	Chloroethane	ND	0.50	0.17	ND	0.19	0.064	
67-64-1	Acetone	ND	5.0	0.77	ND	2.1	0.32	
75-69-4	Trichlorofluoromethane	ND	0.50	0.17	ND	0.089	0.030	
75-35-4	1,1-Dichloroethene	ND	0.50	0.17	ND	0.13	0.043	
75-09-2	Methylene Chloride	ND	0.50	0.17	ND	0.14	0.049	
76-13-1	Trichlorotrifluoroethane	ND	0.50	0.17	ND	0.065	0.022	
75-15-0	Carbon Disulfide	ND	5.0	0.15	ND	1.6	0.048	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
75-34-3	1,1-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	0.17	ND	0.14	0.047	
78-93-3	2-Butanone (MEK)	ND	5.0	0.21	ND	1.7	0.071	
156-59-2	cis-1,2-Dichloroethene	ND	0.50	0.16	ND	0.13	0.040	
67-66-3	Chloroform	ND	0.50	0.17	ND	0.10	0.035	
107-06-2	1,2-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.17	ND	0.092	0.031	
71-43-2	Benzene	ND	0.50	0.16	ND	0.16	0.050	
56-23-5	Carbon Tetrachloride	ND	0.50	0.15	ND	0.080	0.024	
110-82-7	Cyclohexane	ND	1.0	0.29	ND	0.29	0.084	
78-87-5	1,2-Dichloropropane	ND	0.50	0.16	ND	0.11	0.035	
75-27-4	Bromodichloromethane	ND	0.50	0.15	ND	0.075	0.022	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P1500369
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P150213-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 2/13/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.14	ND	0.11	0.031	
108-10-1	4-Methyl-2-pentanone	ND	0.50	0.16	ND	0.12	0.039	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.16	ND	0.11	0.035	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.16	ND	0.092	0.029	
108-88-3	Toluene	ND	0.50	0.17	ND	0.13	0.045	
591-78-6	2-Hexanone	ND	0.50	0.16	ND	0.12	0.039	
124-48-1	Dibromochloromethane	ND	0.50	0.16	ND	0.059	0.019	
106-93-4	1,2-Dibromoethane	ND	0.50	0.16	ND	0.065	0.021	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
108-90-7	Chlorobenzene	ND	0.50	0.16	ND	0.11	0.035	
100-41-4	Ethylbenzene	ND	0.50	0.16	ND	0.12	0.037	
179601-23-1	m,p-Xylenes	ND	1.0	0.30	ND	0.23	0.069	
75-25-2	Bromoform	ND	0.50	0.15	ND	0.048	0.015	
100-42-5	Styrene	ND	0.50	0.15	ND	0.12	0.035	
95-47-6	o-Xylene	ND	0.50	0.15	ND	0.12	0.035	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.15	ND	0.073	0.022	
98-82-8	Cumene	ND	0.50	0.15	ND	0.10	0.031	
541-73-1	1,3-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
106-46-7	1,4-Dichlorobenzene	ND	0.50	0.14	ND	0.083	0.023	
95-50-1	1,2-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	0.099	ND	0.052	0.010	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	0.16	ND	0.067	0.022	
79-20-9	Methyl Acetate	ND	0.50	0.24	ND	0.17	0.079	**X**
108-87-2	Methylcyclohexane	ND	0.50	0.26	ND	0.12	0.065	**X**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
X = See case narrative.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **Tetra Tech NUS, Inc.**
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Project ID: P1500369

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date(s) Collected: 1/26 - 1/29/15
Analyst: Simon Cao Date(s) Received: 1/30/15
Sample Type: 6.0 L Silonite Canister(s) Date(s) Analyzed: 2/13/15
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P150213-MB	**95**	**99**	**108**	70-130	
Lab Control Sample	P150213-LCS	**93**	**100**	**108**	70-130	
LC39A-AIR-Startup D2-20150126	P1500369-001	**94**	**97**	**108**	70-130	
LC39A-AIR-Startup D3-20150127	P1500369-002	**95**	**95**	**106**	70-130	
LC39A-AIR-Startup D4-20150128	P1500369-003	**95**	**97**	**107**	70-130	
LC39A-AIR-Startup D5-20150129	P1500369-004	**93**	**97**	**107**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1500369
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P150213-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 2/13/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	**Result µg/m³**	**% Recovery**	ALS Acceptance Limits	**Data Qualifier**
75-71-8	Dichlorodifluoromethane (CFC 12)	204	**168**	**82**	66-117	
74-87-3	Chloromethane	198	**161**	**81**	51-133	
75-01-4	Vinyl Chloride	202	**172**	**85**	61-127	
74-83-9	Bromomethane	202	**170**	**84**	62-114	
75-00-3	Chloroethane	202	**168**	**83**	64-122	
67-64-1	Acetone	1,080	**870**	**81**	60-113	
75-69-4	Trichlorofluoromethane	198	**183**	**92**	64-112	
75-35-4	1,1-Dichloroethene	214	**187**	**87**	70-114	
75-09-2	Methylene Chloride	216	**174**	**81**	63-103	
76-13-1	Trichlorotrifluoroethane	216	**182**	**84**	69-116	
75-15-0	Carbon Disulfide	196	**195**	**99**	66-118	
156-60-5	trans-1,2-Dichloroethene	212	**186**	**88**	69-123	
75-34-3	1,1-Dichloroethane	208	**177**	**85**	65-118	
1634-04-4	Methyl tert-Butyl Ether	212	**182**	**86**	57-125	
78-93-3	2-Butanone (MEK)	216	**199**	**92**	63-121	
156-59-2	cis-1,2-Dichloroethene	214	**169**	**79**	69-119	
67-66-3	Chloroform	216	**182**	**84**	68-111	
107-06-2	1,2-Dichloroethane	210	**171**	**81**	67-117	
71-55-6	1,1,1-Trichloroethane	208	**177**	**85**	74-116	
71-43-2	Benzene	220	**172**	**78**	61-109	
56-23-5	Carbon Tetrachloride	214	**194**	**91**	76-120	
110-82-7	Cyclohexane	422	**368**	**87**	72-115	
78-87-5	1,2-Dichloropropane	212	**182**	**86**	67-119	
75-27-4	Bromodichloromethane	216	**189**	**88**	78-124	
79-01-6	Trichloroethene	208	**184**	**88**	69-115	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

Client: **Tetra Tech NUS, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1500369
Client Project ID: **LC39A GW Interim Measure / 112G06925** ALS Sample ID: P150213-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 2/13/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
10061-01-5	cis-1,3-Dichloropropene	226	**210**	**93**	77-124	
108-10-1	4-Methyl-2-pentanone	218	**206**	**94**	66-134	
10061-02-6	trans-1,3-Dichloropropene	216	**209**	**97**	80-130	
79-00-5	1,1,2-Trichloroethane	212	**191**	**90**	75-119	
108-88-3	Toluene	212	**186**	**88**	68-114	
591-78-6	2-Hexanone	222	**201**	**91**	60-136	
124-48-1	Dibromochloromethane	220	**203**	**92**	75-132	
106-93-4	1,2-Dibromoethane	216	**198**	**92**	72-122	
127-18-4	Tetrachloroethene	198	**178**	**90**	67-120	
108-90-7	Chlorobenzene	216	**190**	**88**	69-114	
100-41-4	Ethylbenzene	212	**187**	**88**	71-117	
179601-23-1	m,p-Xylenes	420	**369**	**88**	71-118	
75-25-2	Bromoform	216	**225**	**104**	76-149	
100-42-5	Styrene	218	**197**	**90**	71-128	
95-47-6	o-Xylene	206	**181**	**88**	72-118	
79-34-5	1,1,2,2-Tetrachloroethane	202	**190**	**94**	73-124	
98-82-8	Cumene	204	**180**	**88**	71-118	
541-73-1	1,3-Dichlorobenzene	218	**197**	**90**	67-121	
106-46-7	1,4-Dichlorobenzene	212	**183**	**86**	68-121	
95-50-1	1,2-Dichlorobenzene	214	**190**	**89**	68-121	
96-12-8	1,2-Dibromo-3-chloropropane	206	**210**	**102**	73-145	
120-82-1	1,2,4-Trichlorobenzene	210	**180**	**86**	60-135	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

Client: **Tetra Tech NUS, Inc.** ALS Project ID: P1500369
Client Project ID: **LC39A GW Interim Measure / 112G06925**

Method Blank Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Lab File ID: 02131504.D
Analyst: Simon Cao Date Analyzed: 2/13/15
Sample Type: 6.0 L Silonite Canister(s) Time Analyzed: 07:22
Test Notes:

Client Sample ID	ALS Sample ID	Lab File ID	Time Analyzed
Lab Control Sample	P150213-LCS	02131505.D	07:55
LC39A-AIR-Startup D2-20150126	P1500369-001	02131525.D	19:59
LC39A-AIR-Startup D3-20150127	P1500369-002	02131526.D	20:33
LC39A-AIR-Startup D4-20150128	P1500369-003	02131527.D	21:07
LC39A-AIR-Startup D5-20150129	P1500369-004	02131528.D	21:41

Client: **Tetra Tech NUS, Inc.** ALS Project ID: P1500369

Client Project ID: **LC39A GW Interim Measure / 112G06925**

Internal Standard Area and RT Summary

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Lab File ID: 02131501.D

Analyst: Simon Cao Date Analyzed: 2/13/15

Sample Type: 6.0 L Silonite Canister(s) Time Analyzed: 05:40

Test Notes:

		IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	24 Hour Standard	150973	9.04	760775	11.01	285749	15.36
	Upper Limit	211362	9.37	1065085	11.34	400049	15.69
	Lower Limit	90584	8.71	456465	10.68	171449	15.03
	Client Sample ID						
01	Method Blank	142191	9.02	730344	11.00	270786	15.35
02	Lab Control Sample	151242	9.04	759953	11.01	276986	15.36
03	LC39A-AIR-Startup D2-20150126	150351	9.02	771362	11.00	298672	15.35
04	LC39A-AIR-Startup D3-20150127	148708	9.02	766937	11.00	300006	15.35
05	LC39A-AIR-Startup D4-20150128	148873	9.02	760839	11.00	294821	15.35
06	LC39A-AIR-Startup D5-20150129	146211	9.02	764809	11.00	293613	15.35

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area
AREA LOWER LIMIT = 60% of internal standard area
RT UPPER LIMIT = 0.33 minutes of internal standard RT
RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.
I = Internal standard not within the speicified limits.

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131525.D
Acq On : 13 Feb 2015 19:59 Operator: SC
Sample : P1500369-001 (1000ml)
Misc : S29-01081512
ALS Vial : 5 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:08:51 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	150351	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.00	114	771362	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	298672	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	194366	11.724	ng		-0.02
Spiked Amount 12.500			Recovery = 93.76%				
57) Toluene-d8 (SS2)	13.44	98	744457	12.098	ng		0.00
Spiked Amount 12.500			Recovery = 96.80%				
73) Bromofluorobenzene (SS3)	16.96	174	310682	13.470	ng		0.00
Spiked Amount 12.500			Recovery = 107.76%				
Target Compounds							Qvalue
2) Propene	0.00	42	0	N.D. d			
3) Dichlorodifluoromethan...	3.90	85	38530	1.313	ng		100
4) Chloromethane	4.10	50	3838	0.204	ng		96
5) 1,2-Dichloro-1,1,2,2-t...	4.27	135	1060	N.D.			
6) Vinyl Chloride	4.38	62	974	N.D.			
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	4.86	94	276	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	5.24	45	16398	1.727	ng		97
11) Acetonitrile	5.47	41	2692	0.120	ng	#	62
12) Acrolein	5.61	56	1028	0.139	ng		98
13) Acetone	5.74	58	32344	3.237	ng		93
14) Trichlorofluoromethane	5.93	101	17511	0.741	ng		99
15) 2-Propanol (Isopropanol)	6.03	45	62030	1.990	ng		95
16) Acrylonitrile	6.27	53	127	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	6.74	59	894	N.D.			
19) Methylene Chloride	6.75	84	3462	0.218	ng		98
20) 3-Chloro-1-propene (Al...	6.82	41	106	N.D.			
21) Trichlorotrifluoroethane	7.08	151	599921	44.286	ng		99
22) Carbon Disulfide	7.04	76	2481	N.D.			
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	8.01	73	928	N.D.			
26) Vinyl Acetate	8.15	86	1036	0.320	ng	#	1
27) 2-Butanone (MEK)	8.41	72	8278	0.909	ng	#	3
28) cis-1,2-Dichloroethene	8.86	61	345	N.D.			
29) Diisopropyl Ether	9.16	87	78	N.D.			
30) Ethyl Acetate	9.12	61	2588	0.525	ng		90
31) n-Hexane	9.11	57	4089	0.180	ng	#	96
32) Chloroform	9.16	83	1387	N.D.			
34) Tetrahydrofuran (THF)	9.61	72	277	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	9.92	62	720	N.D.			
38) 1,1,1-Trichloroethane	10.19	97	84	N.D.			
39) Isopropyl Acetate	10.64	61	51	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	10.64	78	49451	0.768	ng		99
42) Carbon Tetrachloride	10.80	117	5310	0.276	ng		99
43) Cyclohexane	10.93	84	1194	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	11.46	63	44	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.			
47) Trichloroethene	11.69	130	481	N.D.			
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	11.77	57	2194	N.D.			

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131525.D
Acq On : 13 Feb 2015 19:59 Operator: SC
Sample : P1500369-001 (1000ml)
Misc : S29-01081512
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 16 10:08:51 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

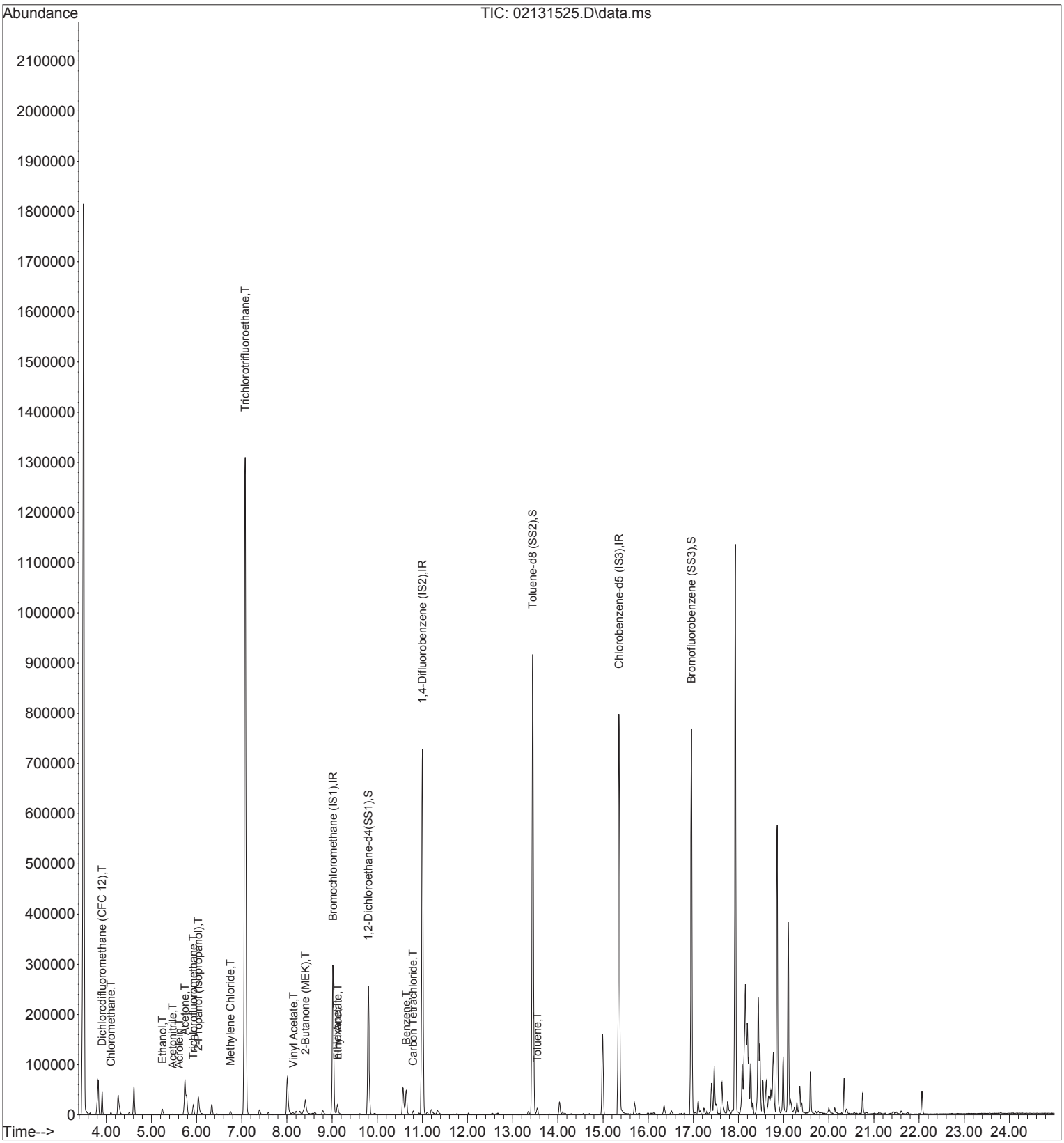
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	12.03	100	169	N.D.	
51) n-Heptane	12.02	71	916	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	12.61	58	334	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	13.55	91	11424	0.165 ng	100
59) 2-Hexanone	13.81	43	1798	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	14.45	43	1260	N.D.	
63) n-Octane	14.57	57	542	N.D.	
64) Tetrachloroethene	14.71	166	578	N.D.	
65) Chlorobenzene	15.39	112	747	N.D.	
66) Ethylbenzene	15.81	91	1949	N.D.	
67) m- p- ylenes	15.99	91	3333	N.D.	
68) Bromoform	16.06	173	205	N.D.	
69) Styrene	16.38	104	1864	N.D.	
70) o- ylene	16.49	91	1538	N.D.	
71) n-Nonane	16.73	43	1002	N.D.	
72) 1,1,2,2-Tetrachloroethane	16.52	83	257	N.D.	
74) Cumene	17.11	105	582	N.D.	
75) alpha-Pinene	17.52	93	3422	N.D.	
76) n-Propylbenzene	17.63	91	1228	N.D.	
77) 3-Ethyltoluene	17.76	105	1292	N.D.	
78) 4-Ethyltoluene	17.80	105	969	N.D.	
79) 1,3,5-Trimethylbenzene	17.88	105	502	N.D.	
80) alpha-Methylstyrene	18.03	118	414	N.D.	
81) 2-Ethyltoluene	18.07	105	780	N.D.	
82) 1,2,4-Trimethylbenzene	18.30	105	2230	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	18.44	91	416	N.D.	
85) 1,3-Dichlorobenzene	18.46	146	306	N.D.	
86) 1,4-Dichlorobenzene	18.53	146	1023	N.D.	
87) sec-Butylbenzene	18.59	105	512	N.D.	
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D. d	
89) 1,2,3-Trimethylbenzene	18.75	105	1154	N.D.	
90) 1,2-Dichlorobenzene	18.88	146	270	N.D.	
91) d-Limonene	18.90	68	1095	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	19.77	57	2453	N.D.	
94) 1,2,4-Trichlorobenzene	20.70	180	283	N.D.	
95) Naphthalene	20.82	128	2155	N.D.	
96) n-Dodecane	20.85	57	1087	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	16.14	55	1368	N.D.	
99) tert-Butylbenzene	18.28	119	2357	N.D.	
100) n-Butylbenzene	19.18	91	2132	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131525.D
Acq On : 13 Feb 2015 19:59 Operator: SC
Sample : P1500369-001 (1000ml)
Misc : S29-01081512
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 16 10:08:51 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131525.D
Acq On : 13 Feb 2015 19:59 Operator: SC
Sample : P1500369-001 (1000ml)
Misc : S29-01081512
ALS Vial : 5 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:08:51 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

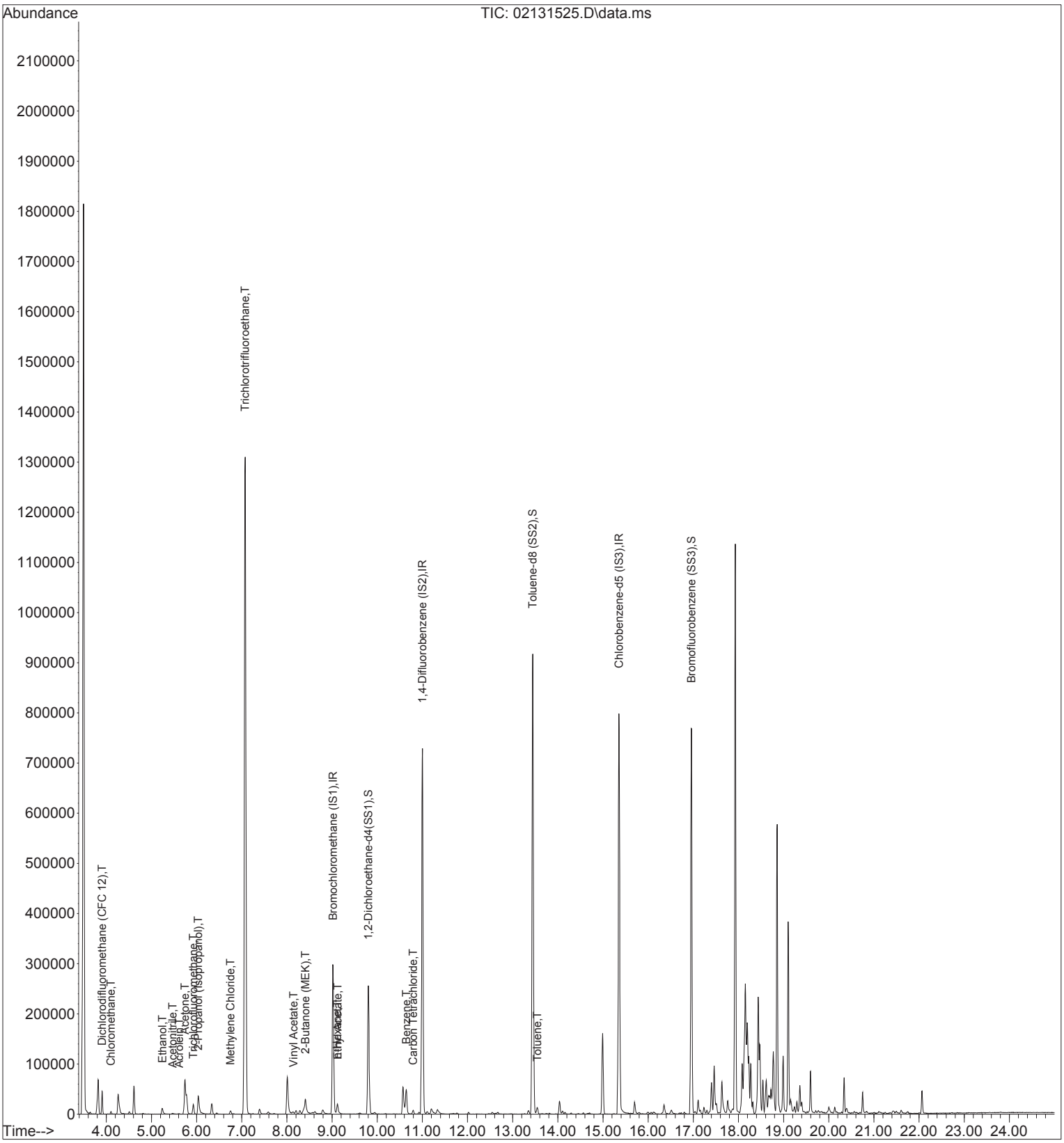
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	150351	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.00	114	771362	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	298672	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	194366	11.724	ng		-0.02
Spiked Amount 12.500			Recovery = 93.76%				
57) Toluene-d8 (SS2)	13.44	98	744457	12.098	ng		0.00
Spiked Amount 12.500			Recovery = 96.80%				
73) Bromofluorobenzene (SS3)	16.96	174	310682	13.470	ng		0.00
Spiked Amount 12.500			Recovery = 107.76%				
Target Compounds							Qvalue
3) Dichlorodifluoromethan...	3.90	85	38530	1.313	ng		100
4) Chloromethane	4.10	50	3838	0.204	ng		96
10) Ethanol	5.24	45	16398	1.727	ng		97
11) Acetonitrile	5.47	41	2692	0.120	ng	#	62
12) Acrolein	5.61	56	1028	0.139	ng		98
13) Acetone	5.74	58	32344	3.237	ng		93
14) Trichlorofluoromethane	5.93	101	17511	0.741	ng		99
15) 2-Propanol (Isopropanol)	6.03	45	62030	1.990	ng		95
19) Methylene Chloride	6.75	84	3462	0.218	ng		98
21) Trichlorotrifluoroethane	7.08	151	599921	44.286	ng		99
26) Vinyl Acetate	8.15	86	1036	0.320	ng	#	1
27) 2-Butanone (MEK)	8.41	72	8278	0.909	ng	#	3
30) Ethyl Acetate	9.12	61	2588	0.525	ng		90
31) n-Hexane	9.11	57	4089	0.180	ng	#	96
41) Benzene	10.64	78	49451	0.768	ng		99
42) Carbon Tetrachloride	10.80	117	5310	0.276	ng		99
58) Toluene	13.55	91	11424	0.165	ng		100

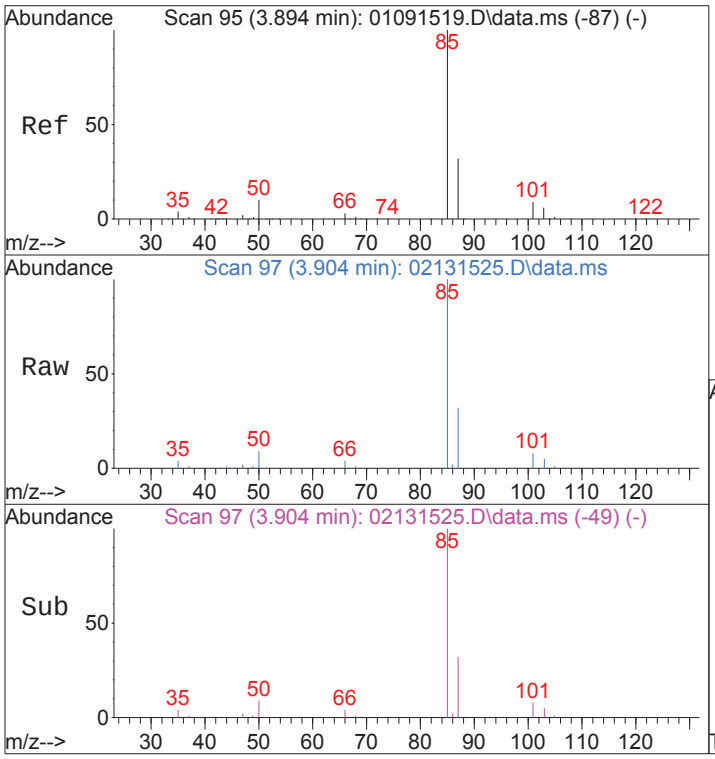
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131525.D
Acq On : 13 Feb 2015 19:59 Operator: SC
Sample : P1500369-001 (1000ml)
Misc : S29-01081512
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 16 10:08:51 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

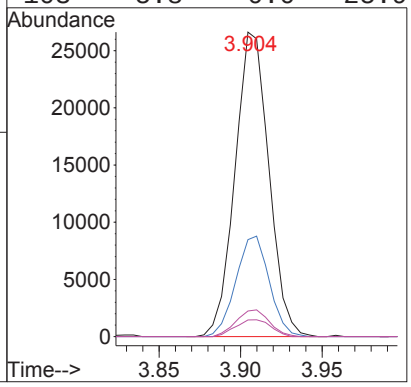


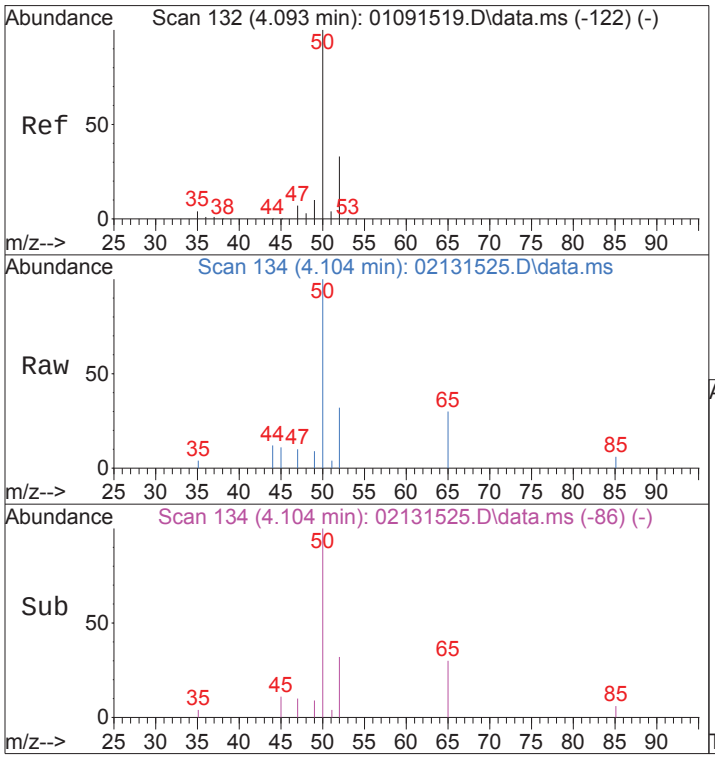


#3
Dichlorodifluoromethane (CFC 12)
Concen: 1.31 ng
RT: 3.90 min Scan# 97
Delta R.T. 0.011 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 85 Resp: 38530

Ion	Ratio	Lower	Upper
85	100		
87	32.6	12.4	52.4
101	8.6	0.0	29.0
103	5.8	0.0	25.9

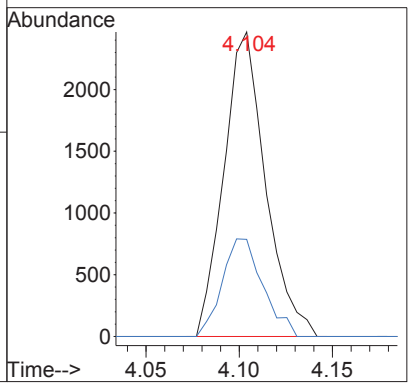


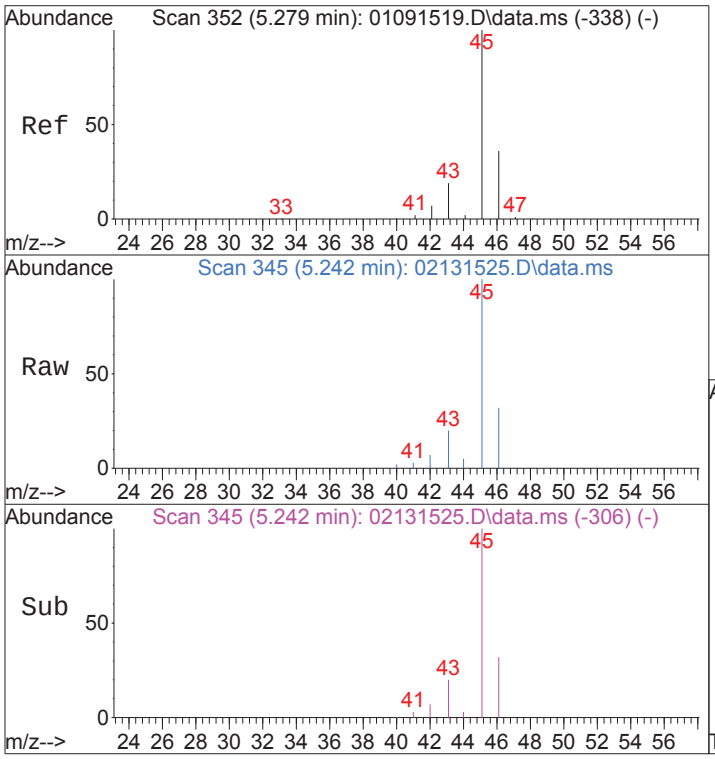


#4
Chloromethane
Concen: 0.20 ng
RT: 4.10 min Scan# 134
Delta R.T. 0.011 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 50 Resp: 3838

Ion	Ratio	Lower	Upper
50	100		
52	31.3	13.3	53.3

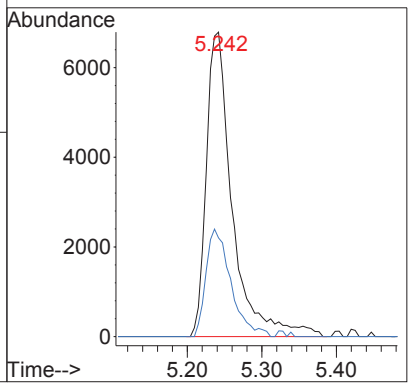


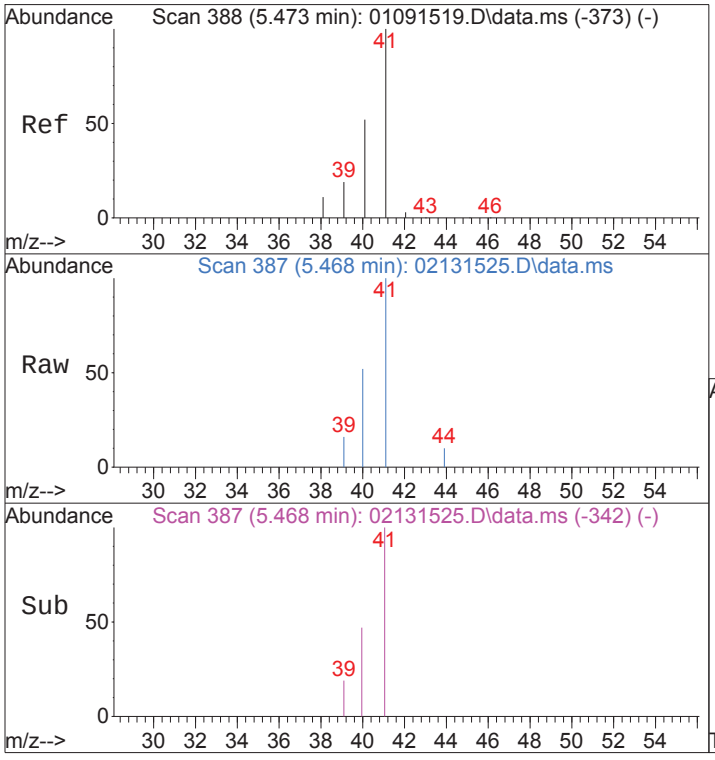


#10
Ethanol
Concen: 1.73 ng
RT: 5.24 min Scan# 345
Delta R.T. -0.038 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 45 Resp: 16398

Ion	Ratio	Lower	Upper
45	100		
46	33.9	15.6	55.6

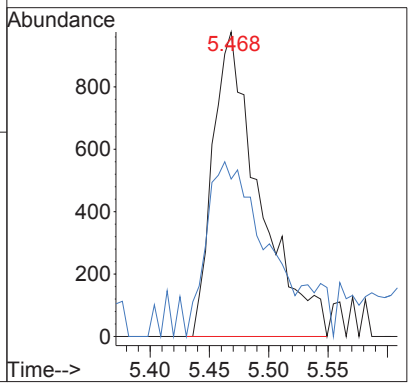


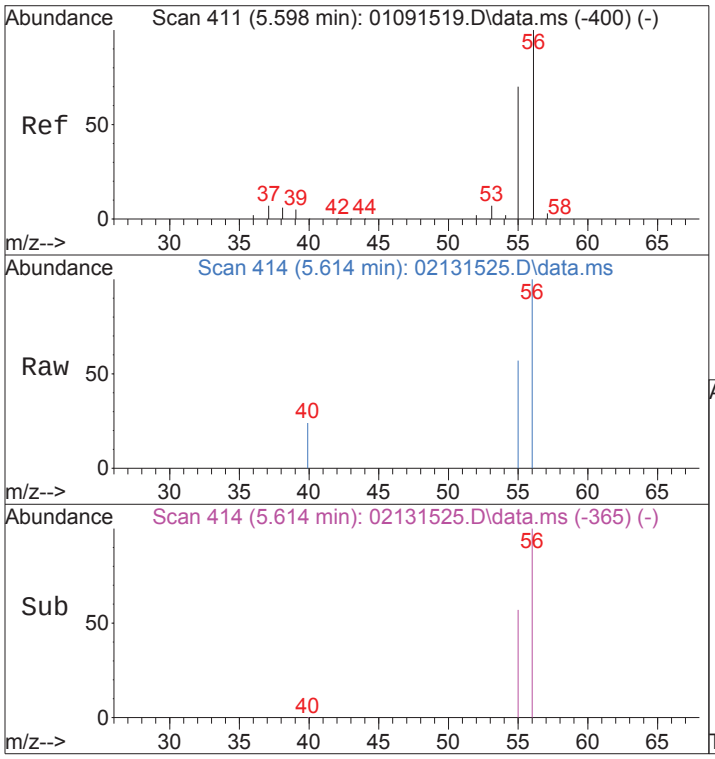


#11
Acetonitrile
Concen: 0.12 ng
RT: 5.47 min Scan# 387
Delta R.T. -0.005 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 41 Resp: 2692

Ion	Ratio	Lower	Upper
41	100		
40	79.1	32.2	72.2#

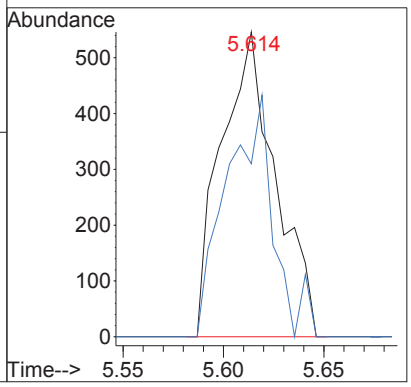


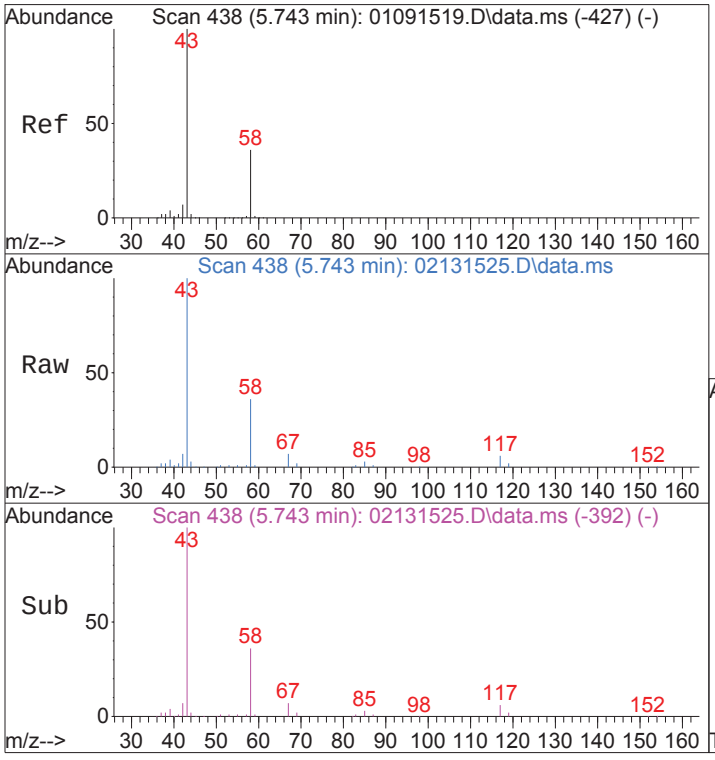


#12
Acrolein
Concen: 0.14 ng
RT: 5.61 min Scan# 414
Delta R.T. 0.016 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 56 Resp: 1028

Ion	Ratio	Lower	Upper
56	100		
55	68.4	49.7	89.7

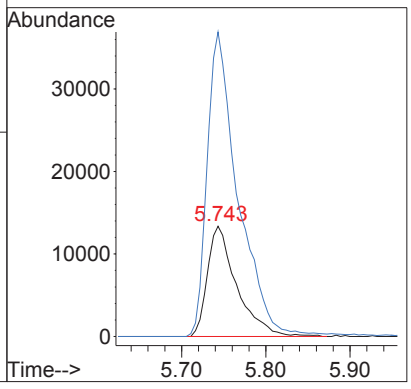


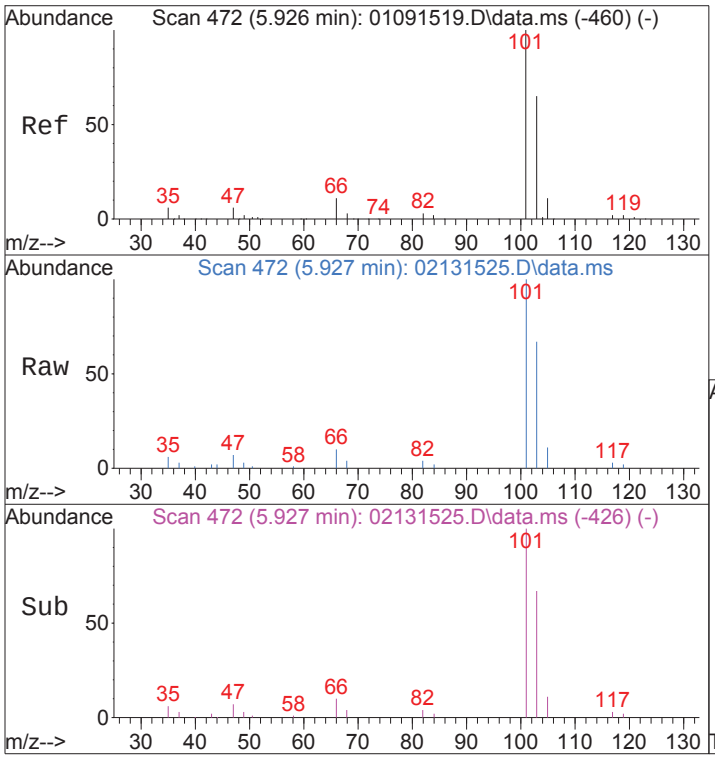


#13
Acetone
Concen: 3.24 ng
RT: 5.74 min Scan# 438
Delta R.T. 0.000 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 58 Resp: 32344

Ion	Ratio	Lower	Upper
58	100		
43	292.5	250.2	310.2

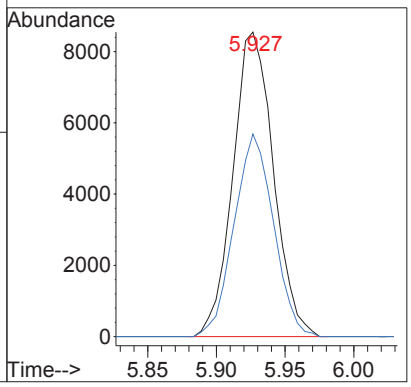


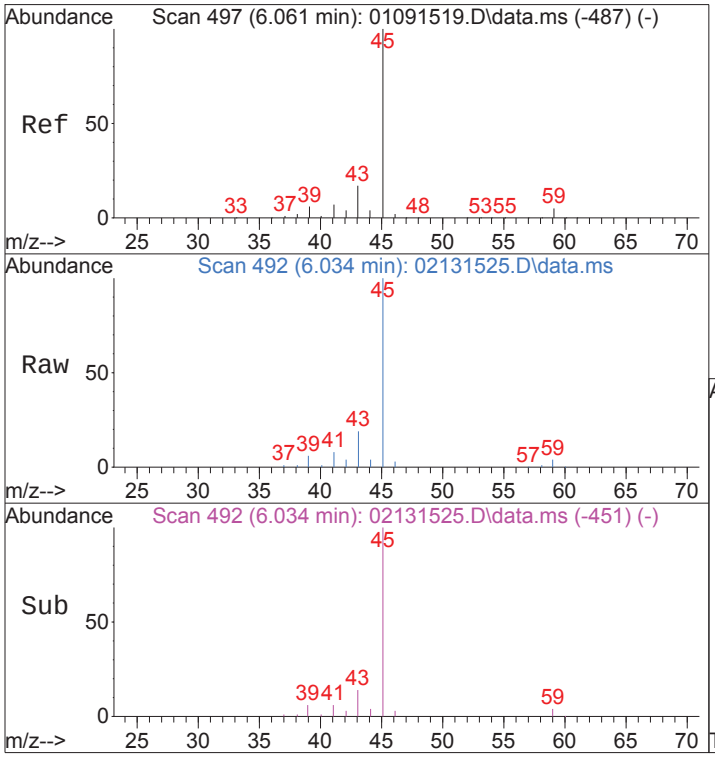


#14
Trichlorofluoromethane
Concen: 0.74 ng
RT: 5.93 min Scan# 472
Delta R.T. 0.000 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion:101 Resp: 17511

Ion	Ratio	Lower	Upper
101	100		
103	64.7	45.5	85.5

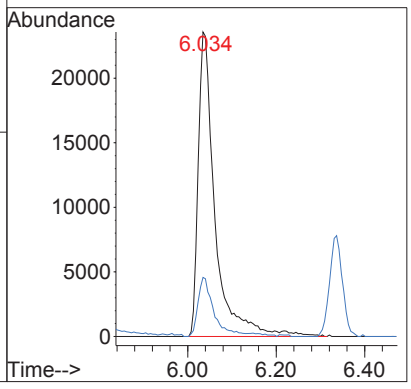


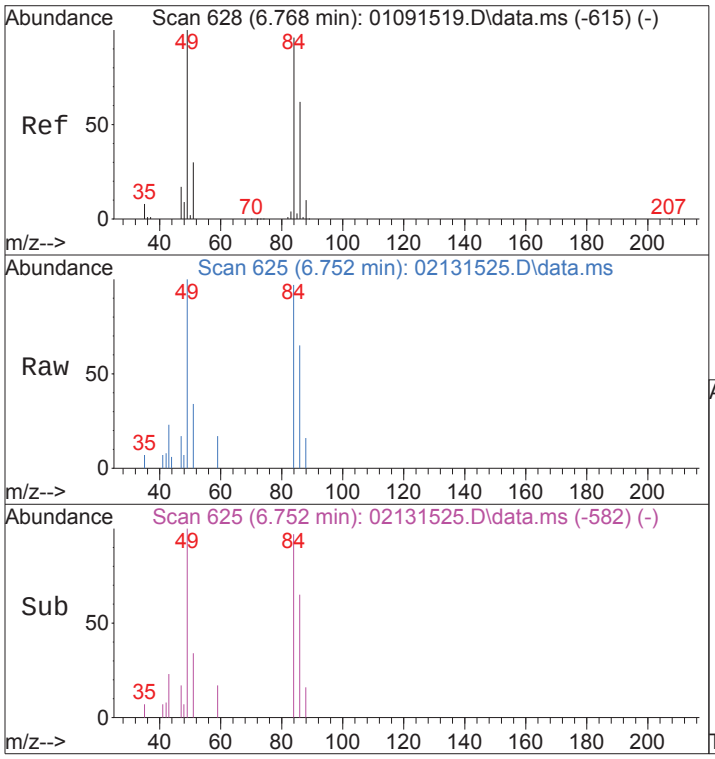


#15
2-Propanol (Isopropanol)
Concen: 1.99 ng
RT: 6.03 min Scan# 492
Delta R.T. -0.027 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 45 Resp: 62030

Ion	Ratio	Lower	Upper
45	100		
43	19.3	0.0	37.3

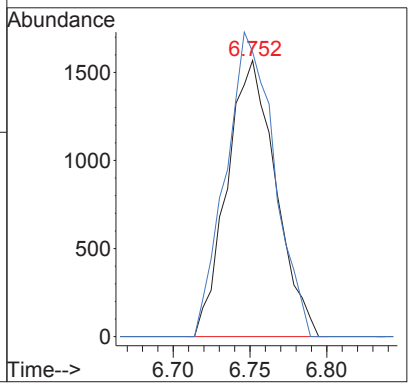


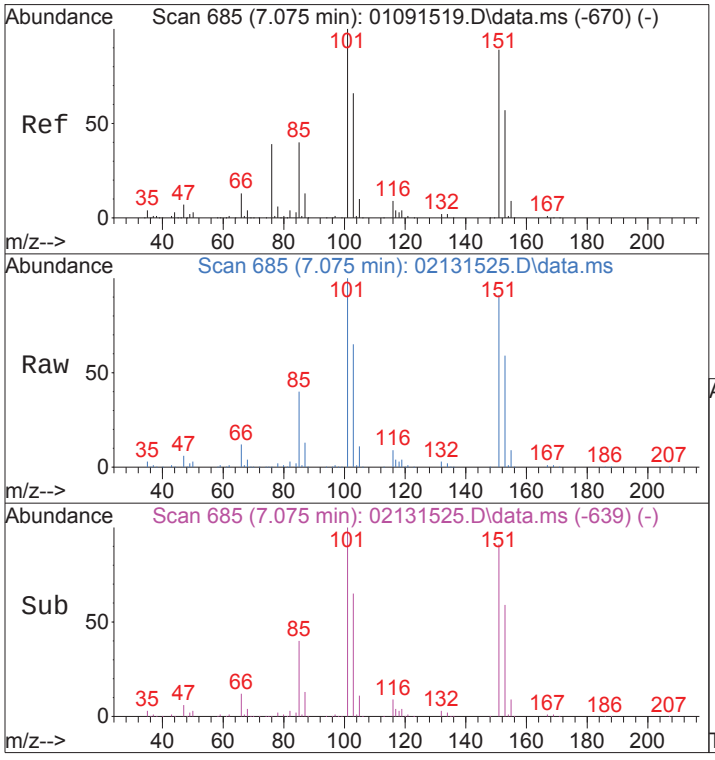


#19
Methylene Chloride
Concen: 0.22 ng
RT: 6.75 min Scan# 625
Delta R.T. -0.016 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 84 Resp: 3462

Ion	Ratio	Lower	Upper
84	100		
49	109.5	82.1	132.1

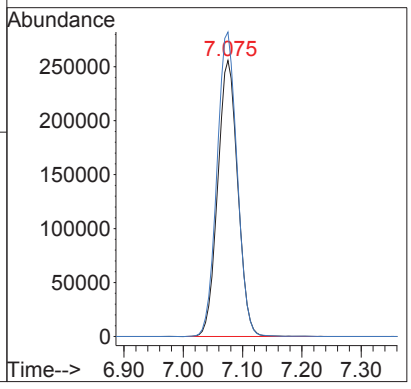


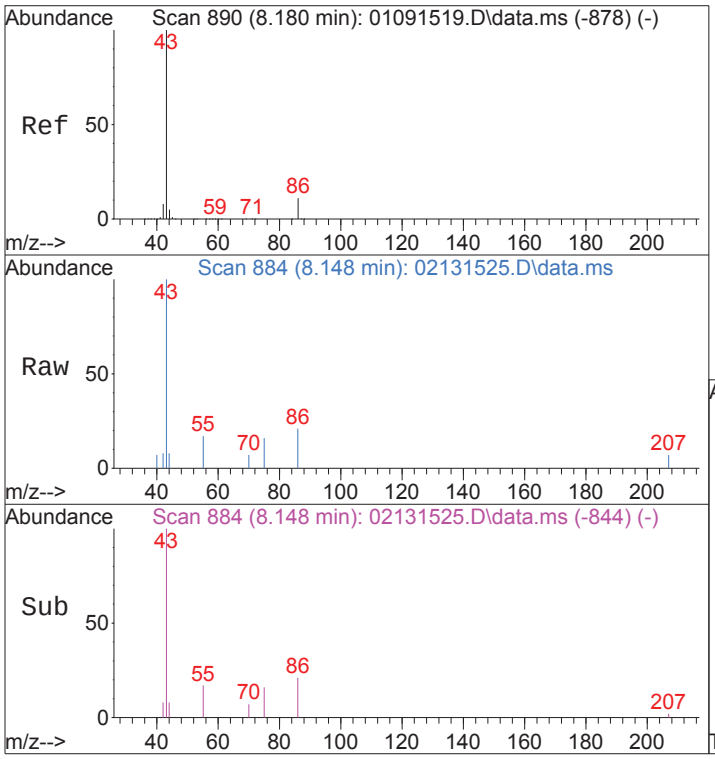


#21
Trichlorotrifluoroethane
Concen: 44.29 ng
RT: 7.08 min Scan# 685
Delta R.T. 0.000 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion:151 Resp: 599921

Ion	Ratio	Lower	Upper
151	100		
101	111.0	91.9	131.9

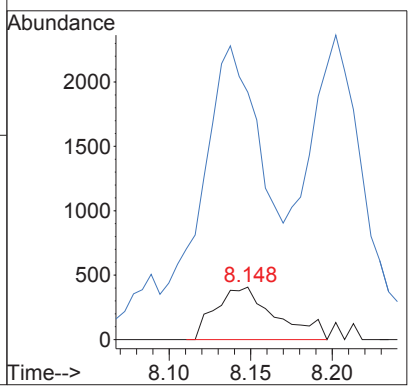


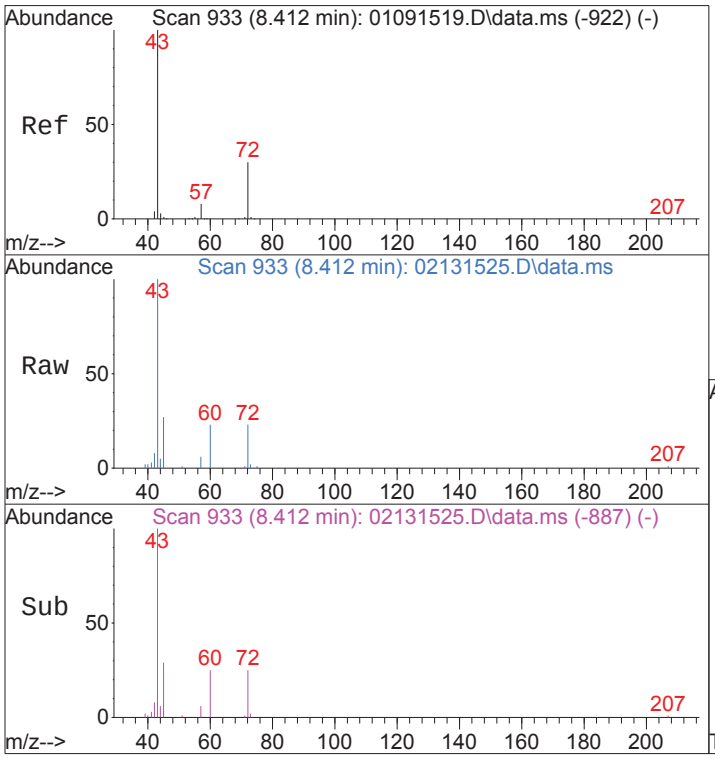


#26
Vinyl Acetate
Concen: 0.32 ng
RT: 8.15 min Scan# 884
Delta R.T. -0.032 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 86 Resp: 1036

Ion	Ratio	Lower	Upper
86	100		
43	435.7	927.5	967.5#

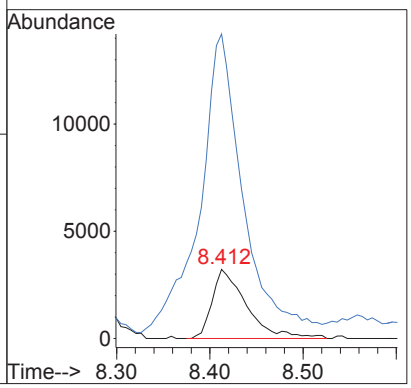


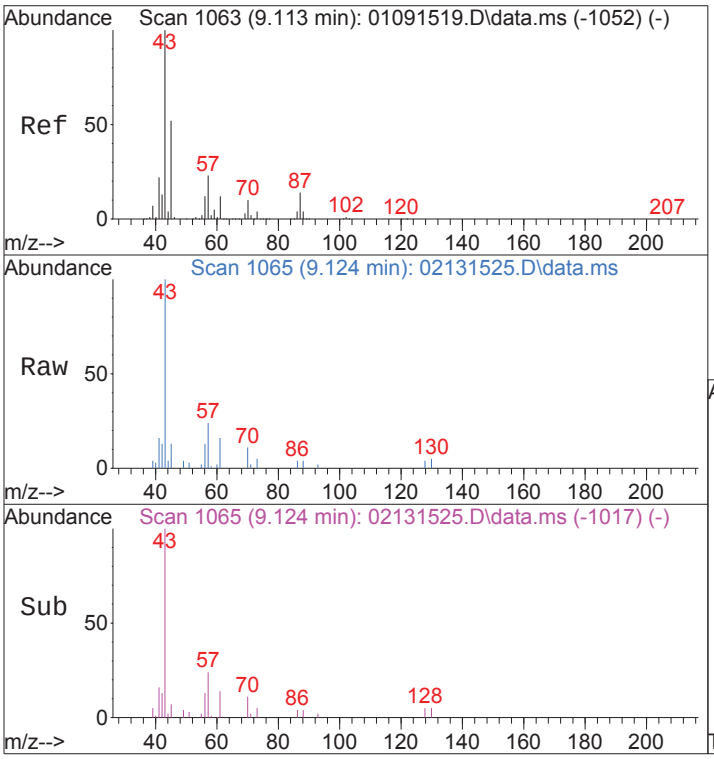


#27
2-Butanone (MEK)
Concen: 0.91 ng
RT: 8.41 min Scan# 933
Delta R.T. 0.000 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 72 Resp: 8278

Ion	Ratio	Lower	Upper
72	100		
43	539.1	315.1	355.1#

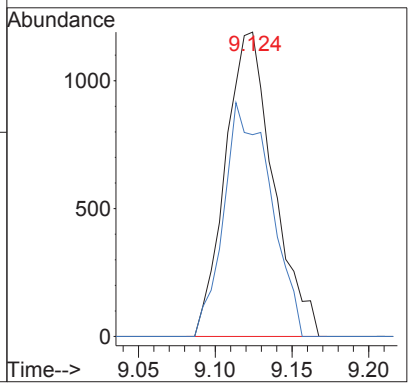


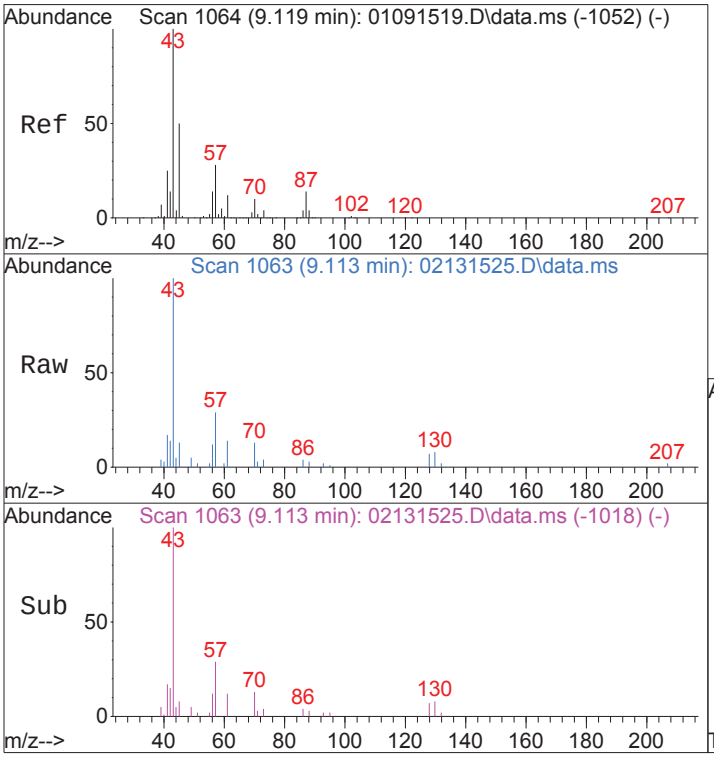


#30
Ethyl Acetate
Concen: 0.52 ng
RT: 9.12 min Scan# 1065
Delta R.T. 0.011 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 61 Resp: 2588

Ion	Ratio	Lower	Upper
61	100		
70	75.0	64.3	104.3

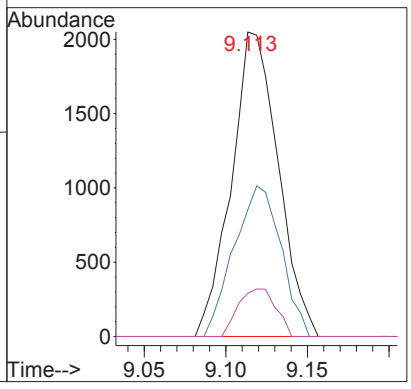


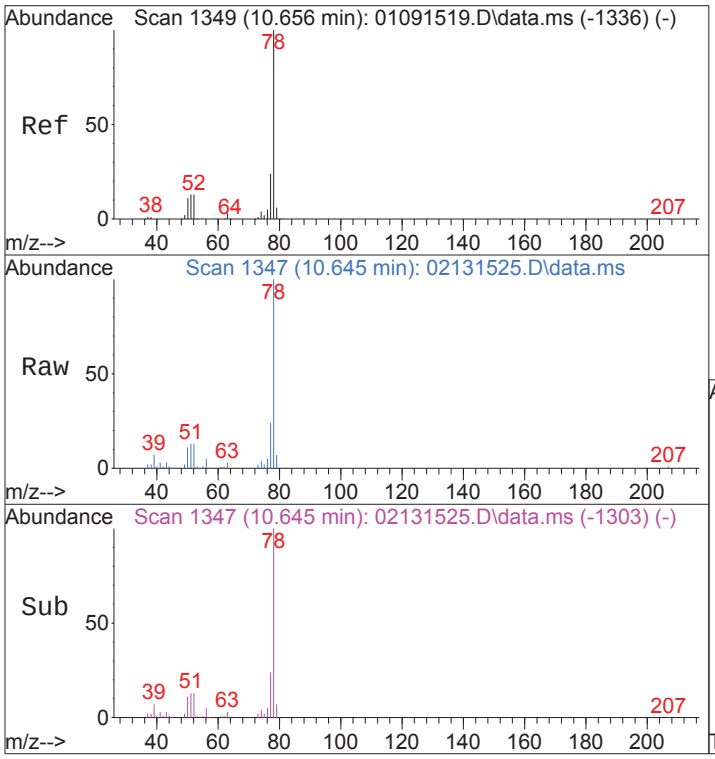


#31
n-Hexane
Concen: 0.18 ng
RT: 9.11 min Scan# 1063
Delta R.T. -0.005 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 57 Resp: 4089

Ion	Ratio	Lower	Upper
57	100		
56	49.6	40.9	61.3
86	12.6	13.0	19.4#

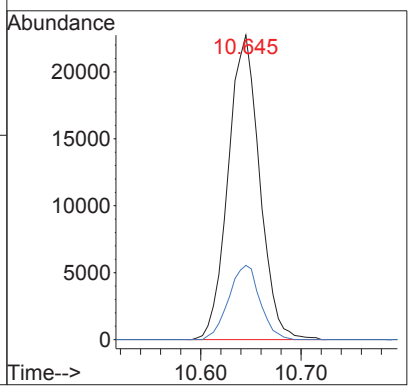


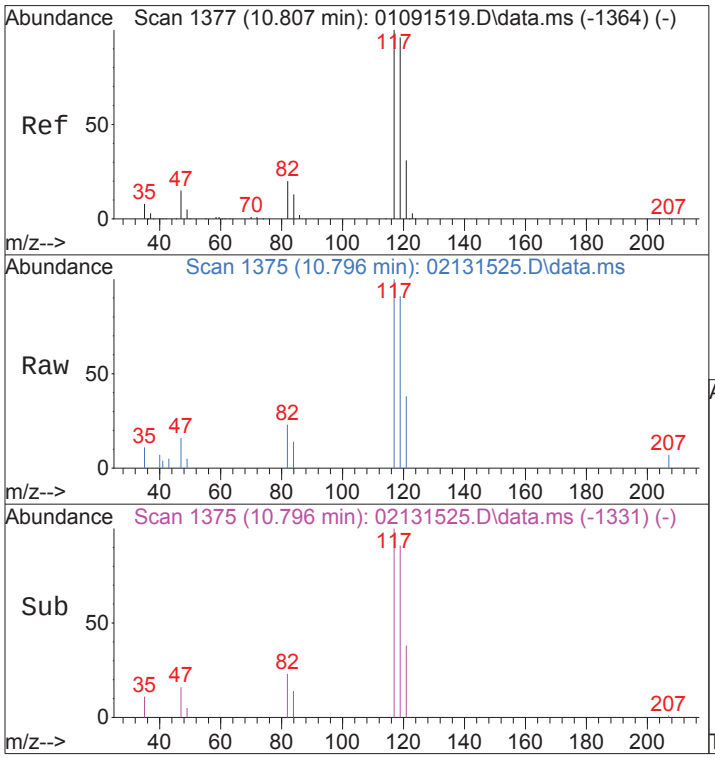


#41
Benzene
Concen: 0.77 ng
RT: 10.64 min Scan# 1347
Delta R.T. -0.011 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 78 Resp: 49451

Ion	Ratio	Lower	Upper
78	100		
77	24.2	3.6	43.6

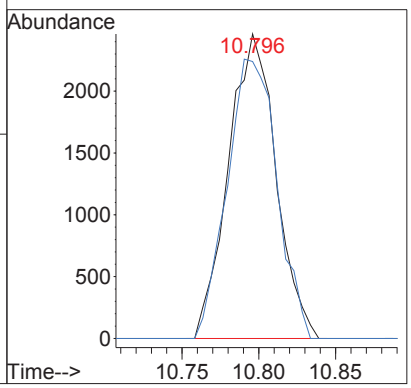


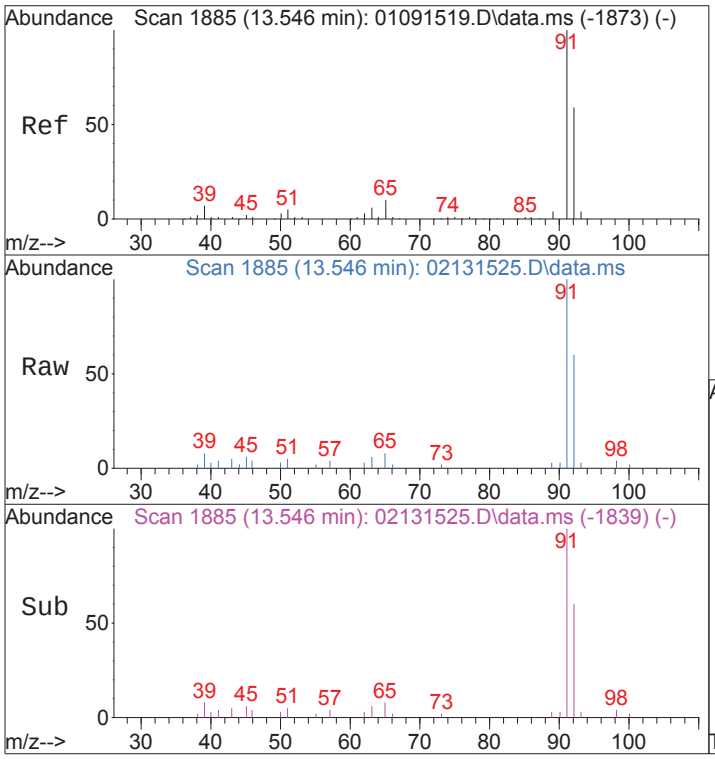


#42
Carbon Tetrachloride
Concen: 0.28 ng
RT: 10.80 min Scan# 1375
Delta R.T. -0.011 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion:117 Resp: 5310

Ion	Ratio	Lower	Upper
117	100		
119	96.0	76.6	116.6

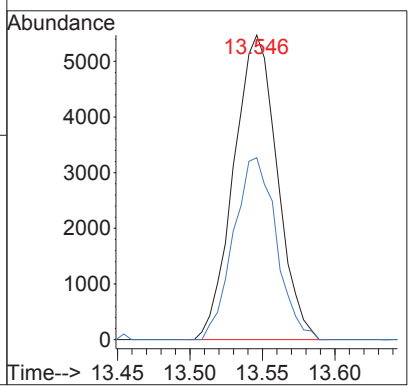




#58
Toluene
Concen: 0.17 ng
RT: 13.55 min Scan# 1885
Delta R.T. 0.000 min
Lab File: 02131525.D
Acq: 13 Feb 2015 19:59

Tgt Ion: 91 Resp: 11424

Ion	Ratio	Lower	Upper
91	100		
92	58.8	39.0	79.0



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131525.D
Acq On : 13 Feb 2015 19:59 Operator: SC
Sample : P1500369-001 (1000ml)
Misc : S29-01081512
ALS Vial : 5 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:22:33 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

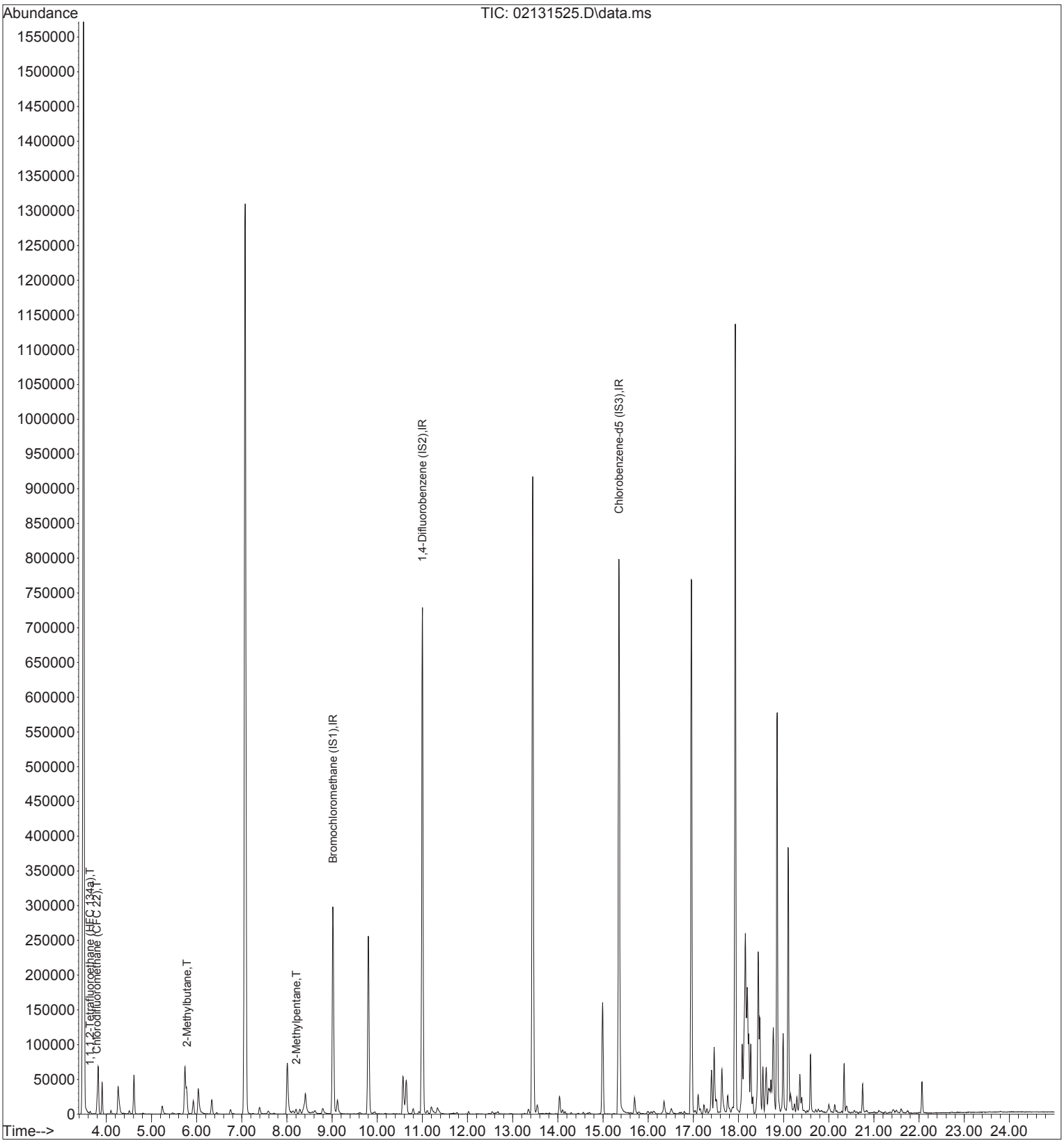
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	150351	12.500	ng		-0.01
16) 1,4-Difluorobenzene (IS2)	11.00	114	771362	12.500	ng		0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	298819	12.500	ng		0.00
Target Compounds							Qvalue
2) Chloropentafluoroethane	3.58	85	390	N.D.			
3) 1,1,1,2-Tetrafluoroeth...	3.64	83	1350	0.121	ng	#	56
4) 1,1-Difluoroethane	3.72	65	89	N.D.			
5) Chlorodifluoromethane ...	3.79	67	1017	0.310	ng		76
6) 1-Chloro-1,1-Difluoroe...	4.10	65	1133	N.D.			
7) Dichlorofluoromethane ...	0.00	67	0	N.D.			
8) Vinylbromide	0.00	108	0	N.D.			
9) 2,2-Dichloro-1,1,1-tri...	5.72	83	546	N.D.			
10) 2-Methylbutane	5.79	57	10312	0.854	ng	#	78
11) Methyl Acetate	6.76	43	1095	N.D.			
12) 2-Methylpentane	8.21	71	1982	0.152	ng		87
13) 2,2-Dichloropropane	0.00	77	0	N.D.			
14) 1,1-Dichloropropene	0.00	75	0	N.D.			
15) Thiophene	10.79	84	728	N.D.			
17) 2,3-Dimethylpentane	11.17	56	413	N.D.			
18) Dibromomethane	11.42	174	36	N.D.			
20) Methyl Cyclohexane	12.67	55	1291	N.D.			
21) 1,3-Dichloropropane	0.00	76	0	N.D.	d		
22) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.			
23) 1-Chlorohexane	0.00	91	0	N.D.			
24) 1,2,3-Trichloropropane	16.53	75	78	N.D.			
25) Bromobenzene	0.00	77	0	N.D.			
26) 2-Chlorotoluene	17.63	91	1228	N.D.			
27) 4-Chlorotoluene	17.63	91	1228	N.D.			
28) Indan	18.95	117	48	N.D.			
29) Indene	0.00	115	0	N.D.			
30) 1,2,4,5-Tetramethylben...	20.00	119	80	N.D.			
31) 1,2,3,4-Tetramethylben...	20.04	119	122	N.D.			
32) 1,2,3,5-Tetramethylben...	20.43	119	41	N.D.			
33) 1,2,3-Trichlorobenzene	0.00	180	0	N.D.			

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131525.D
Acq On : 13 Feb 2015 19:59 Operator: SC
Sample : P1500369-001 (1000ml)
Misc : S29-01081512
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Feb 16 10:22:33 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131526.D
Acq On : 13 Feb 2015 20:33 Operator: SC
Sample : P1500369-002 (1000ml)
Misc : S29-01081512
ALS Vial : 6 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:11:25 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	148708	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	11.00	114	766937	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	300006	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	194372	11.854	ng		-0.02
Spiked Amount 12.500			Recovery = 94.80%				
57) Toluene-d8 (SS2)	13.44	98	735470	11.899	ng		0.00
Spiked Amount 12.500			Recovery = 95.20%				
73) Bromofluorobenzene (SS3)	16.96	174	308306	13.307	ng		0.00
Spiked Amount 12.500			Recovery = 106.48%				
Target Compounds							Qvalue
2) Propene	0.00	42	0	N.D. d			
3) Dichlorodifluoromethan...	3.91	85	38091	1.313	ng		99
4) Chloromethane	4.10	50	3667	0.197	ng		98
5) 1,2-Dichloro-1,1,2,2-t...	4.27	135	1037	N.D.			
6) Vinyl Chloride	4.38	62	1712	N.D.			
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	4.85	94	298	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	5.24	45	10460	1.114	ng		96
11) Acetonitrile	5.47	41	2169	0.098	ng	#	26
12) Acrolein	5.61	56	1004	0.138	ng		97
13) Acetone	5.74	58	25420	2.572	ng		100
14) Trichlorofluoromethane	5.93	101	17287	0.740	ng		97
15) 2-Propanol (Isopropanol)	6.06	45	12410	0.403	ng		94
16) Acrylonitrile	6.34	53	118	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	6.74	59	851	N.D.			
19) Methylene Chloride	6.75	84	3673	0.234	ng		99
20) 3-Chloro-1-propene (Al...	6.82	41	46	N.D.			
21) Trichlorotrifluoroethane	7.07	151	431948	32.238	ng		100
22) Carbon Disulfide	0.00	76	0	N.D. d			
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	8.00	73	581	N.D.			
26) Vinyl Acetate	8.15	86	609	0.190	ng	#	37
27) 2-Butanone (MEK)	8.42	72	4021	0.446	ng		98
28) cis-1,2-Dichloroethene	8.85	61	2381	0.122	ng		91
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	9.12	61	4568	0.936	ng		90
31) n-Hexane	9.12	57	2769	0.123	ng		96
32) Chloroform	9.16	83	1077	N.D.			
34) Tetrahydrofuran (THF)	9.62	72	191	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	9.92	62	527	N.D.			
38) 1,1,1-Trichloroethane	10.19	97	33	N.D.			
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	10.64	78	14809	0.231	ng		99
42) Carbon Tetrachloride	10.80	117	5331	0.278	ng		97
43) Cyclohexane	10.93	84	496	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.			
47) Trichloroethene	11.71	130	407	N.D.			
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	11.77	57	2328	N.D.			

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131526.D
Acq On : 13 Feb 2015 20:33 Operator: SC
Sample : P1500369-002 (1000ml)
Misc : S29-01081512
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 16 10:11:25 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

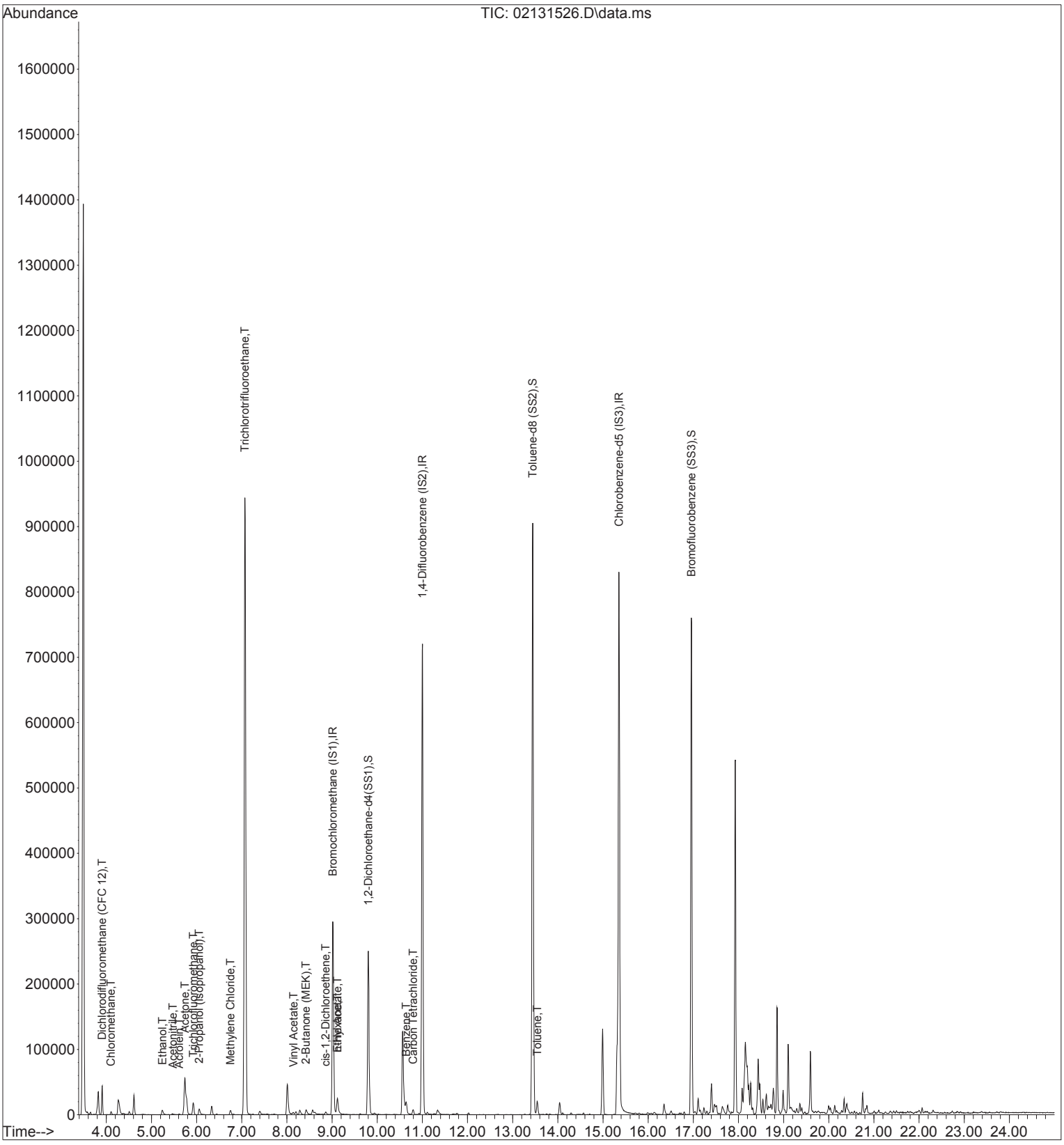
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	12.01	100	157	N.D.	
51) n-Heptane	12.03	71	733	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	13.55	91	18061	0.260 ng	99
59) 2-Hexanone	13.82	43	1123	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	14.46	43	986	N.D.	
63) n-Octane	14.56	57	486	N.D.	
64) Tetrachloroethene	14.70	166	478	N.D.	
65) Chlorobenzene	15.40	112	48	N.D.	
66) Ethylbenzene	15.80	91	1872	N.D.	
67) m- p- ylenes	15.99	91	3091	N.D.	
68) Bromoform	16.06	173	36	N.D.	
69) Styrene	16.38	104	875	N.D.	
70) o- ylene	16.49	91	1760	N.D.	
71) n-Nonane	16.73	43	1092	N.D.	
72) 1,1,2,2-Tetrachloroethane	16.51	83	262	N.D.	
74) Cumene	17.10	105	401	N.D.	
75) alpha-Pinene	17.51	93	2659	N.D.	
76) n-Propylbenzene	17.64	91	1343	N.D.	
77) 3-Ethyltoluene	17.75	105	867	N.D.	
78) 4-Ethyltoluene	17.80	105	600	N.D.	
79) 1,3,5-Trimethylbenzene	17.88	105	201	N.D.	
80) alpha-Methylstyrene	18.04	118	821	N.D.	
81) 2-Ethyltoluene	18.06	105	493	N.D.	
82) 1,2,4-Trimethylbenzene	18.30	105	1496	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	18.54	91	280	N.D.	
85) 1,3-Dichlorobenzene	18.53	146	252	N.D.	
86) 1,4-Dichlorobenzene	18.53	146	252	N.D.	
87) sec-Butylbenzene	18.59	105	685	N.D.	
88) 4-Isopropyltoluene (p-...	18.75	119	867	N.D.	
89) 1,2,3-Trimethylbenzene	18.76	105	396	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	18.91	68	588	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	19.76	57	1465	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	20.82	128	6510	N.D.	
96) n-Dodecane	0.00	57	0	N.D. d	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	16.15	55	1439	N.D.	
99) tert-Butylbenzene	18.27	119	1182	N.D.	
100) n-Butylbenzene	19.19	91	3328	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131526.D
Acq On : 13 Feb 2015 20:33 Operator: SC
Sample : P1500369-002 (1000ml)
Misc : S29-01081512
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 16 10:11:25 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131526.D
Acq On : 13 Feb 2015 20:33 Operator: SC
Sample : P1500369-002 (1000ml)
Misc : S29-01081512
ALS Vial : 6 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:11:25 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

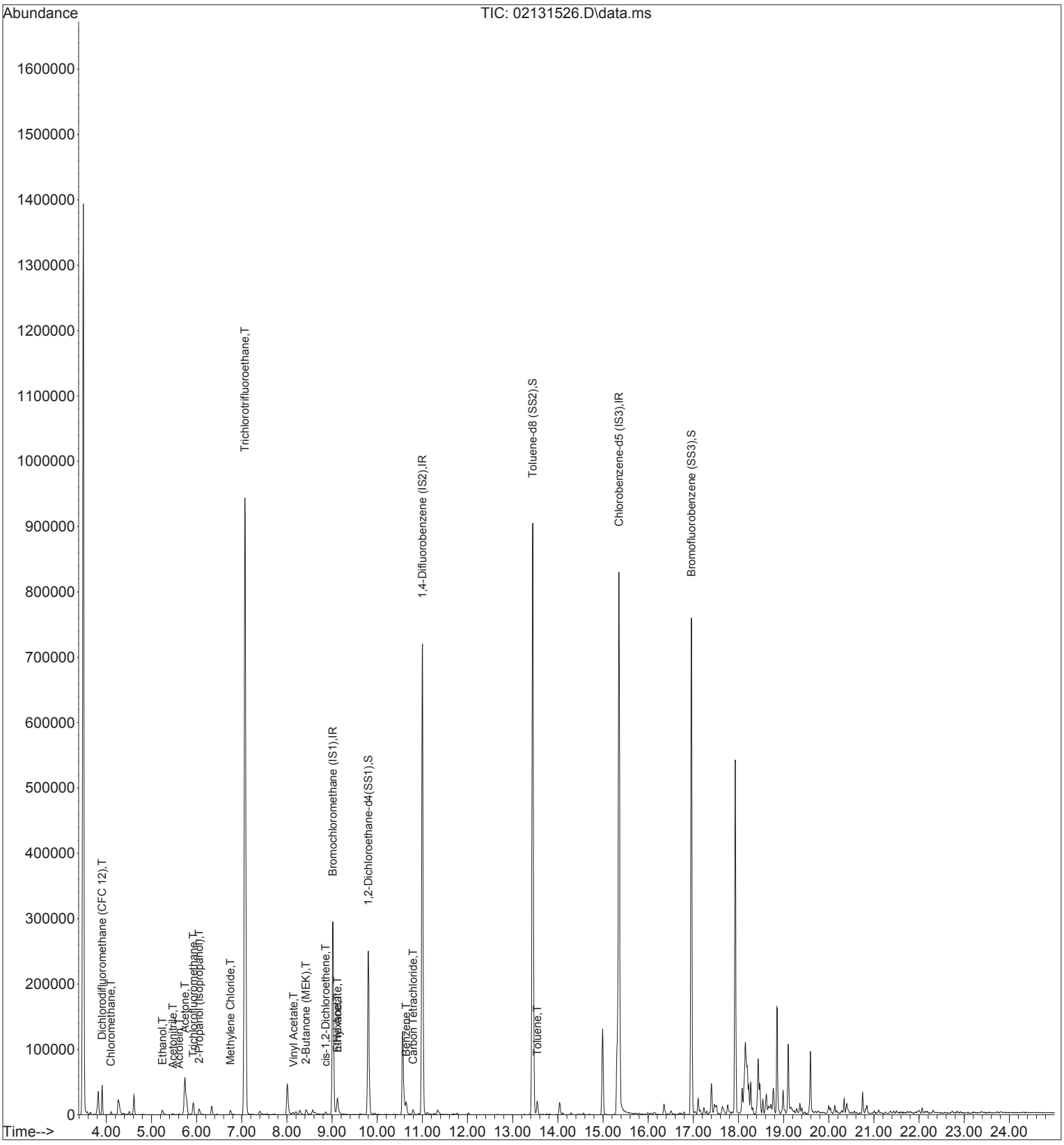
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	148708	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	11.00	114	766937	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	300006	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	194372	11.854	ng		-0.02
Spiked Amount 12.500			Recovery = 94.80%				
57) Toluene-d8 (SS2)	13.44	98	735470	11.899	ng		0.00
Spiked Amount 12.500			Recovery = 95.20%				
73) Bromofluorobenzene (SS3)	16.96	174	308306	13.307	ng		0.00
Spiked Amount 12.500			Recovery = 106.48%				
Target Compounds							Qvalue
3) Dichlorodifluoromethan...	3.91	85	38091	1.313	ng		99
4) Chloromethane	4.10	50	3667	0.197	ng		98
10) Ethanol	5.24	45	10460	1.114	ng		96
11) Acetonitrile	5.47	41	2169	0.098	ng	#	26
12) Acrolein	5.61	56	1004	0.138	ng		97
13) Acetone	5.74	58	25420	2.572	ng		100
14) Trichlorofluoromethane	5.93	101	17287	0.740	ng		97
15) 2-Propanol (Isopropanol)	6.06	45	12410	0.403	ng		94
19) Methylene Chloride	6.75	84	3673	0.234	ng		99
21) Trichlorotrifluoroethane	7.07	151	431948	32.238	ng		100
26) Vinyl Acetate	8.15	86	609	0.190	ng	#	37
27) 2-Butanone (MEK)	8.42	72	4021	0.446	ng		98
28) cis-1,2-Dichloroethene	8.85	61	2381	0.122	ng		91
30) Ethyl Acetate	9.12	61	4568	0.936	ng		90
31) n-Hexane	9.12	57	2769	0.123	ng		96
41) Benzene	10.64	78	14809	0.231	ng		99
42) Carbon Tetrachloride	10.80	117	5331	0.278	ng		97
58) Toluene	13.55	91	18061	0.260	ng		99

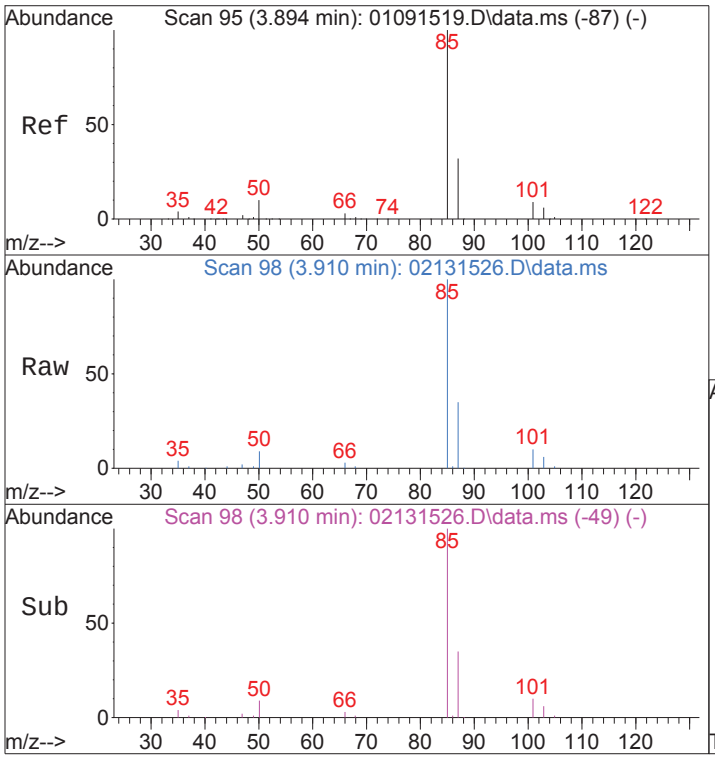
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131526.D
Acq On : 13 Feb 2015 20:33 Operator: SC
Sample : P1500369-002 (1000ml)
Misc : S29-01081512
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 16 10:11:25 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

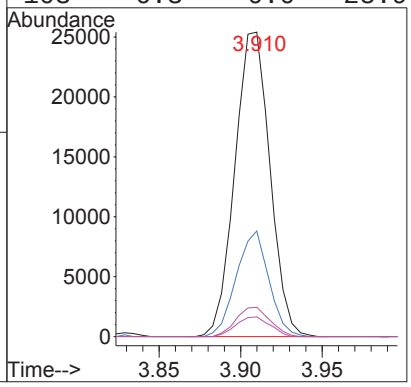


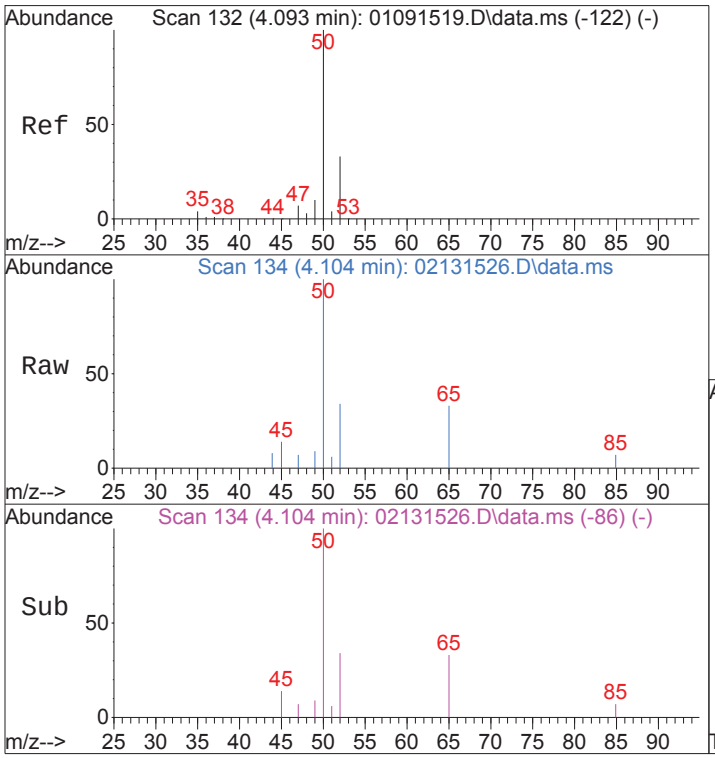


#3
Dichlorodifluoromethane (CFC 12)
Concen: 1.31 ng
RT: 3.91 min Scan# 98
Delta R.T. 0.016 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 85 Resp: 38091

Ion	Ratio	Lower	Upper
85	100		
87	32.2	12.4	52.4
101	9.4	0.0	29.0
103	6.3	0.0	25.9

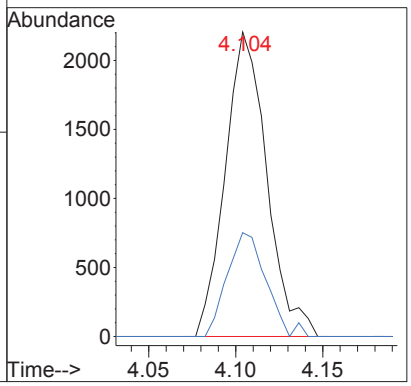


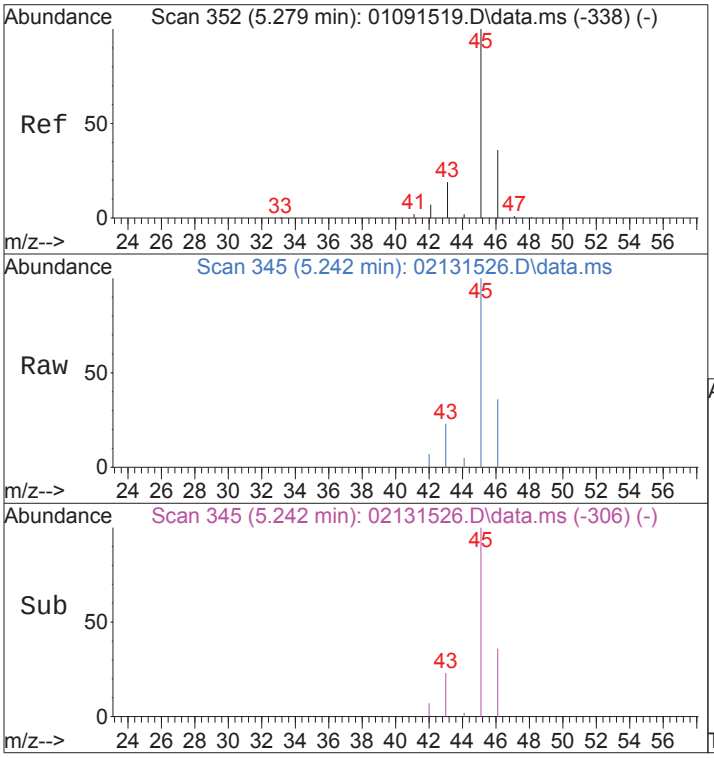


#4
Chloromethane
Concen: 0.20 ng
RT: 4.10 min Scan# 134
Delta R.T. 0.011 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 50 Resp: 3667

Ion	Ratio	Lower	Upper
50	100		
52	31.9	13.3	53.3

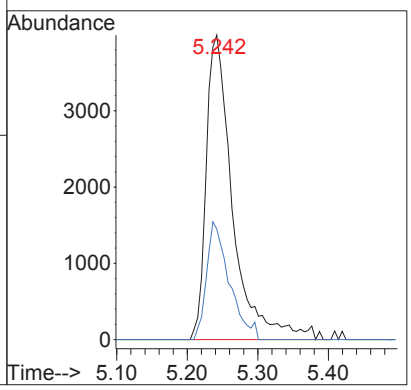


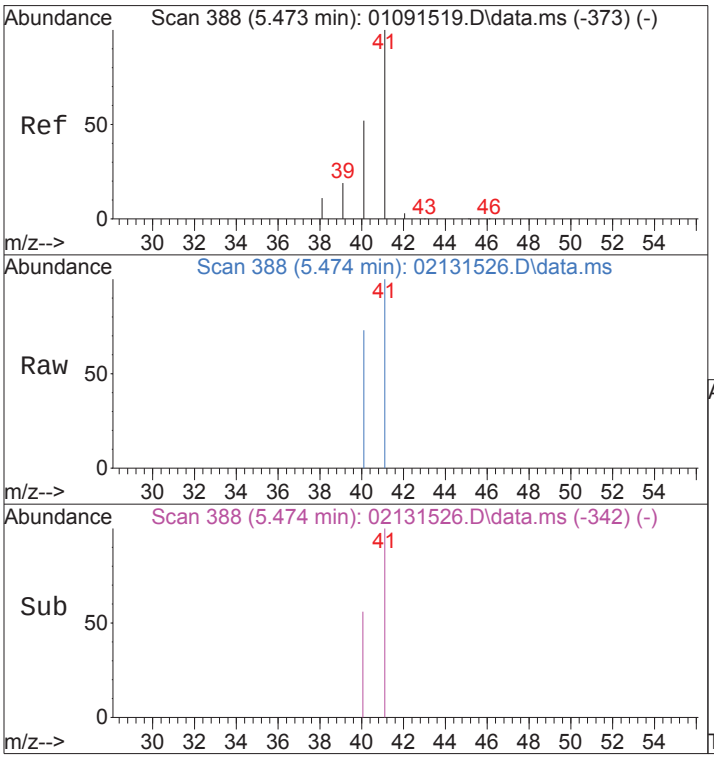


#10
Ethanol
Concen: 1.11 ng
RT: 5.24 min Scan# 345
Delta R.T. -0.038 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 45 Resp: 10460

Ion	Ratio	Lower	Upper
45	100		
46	33.2	15.6	55.6

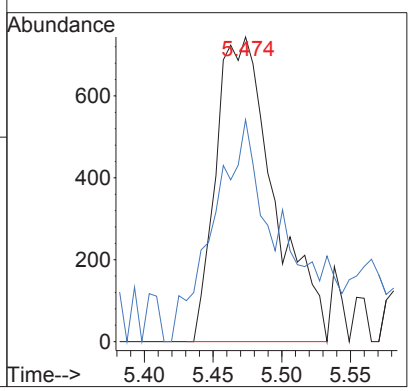


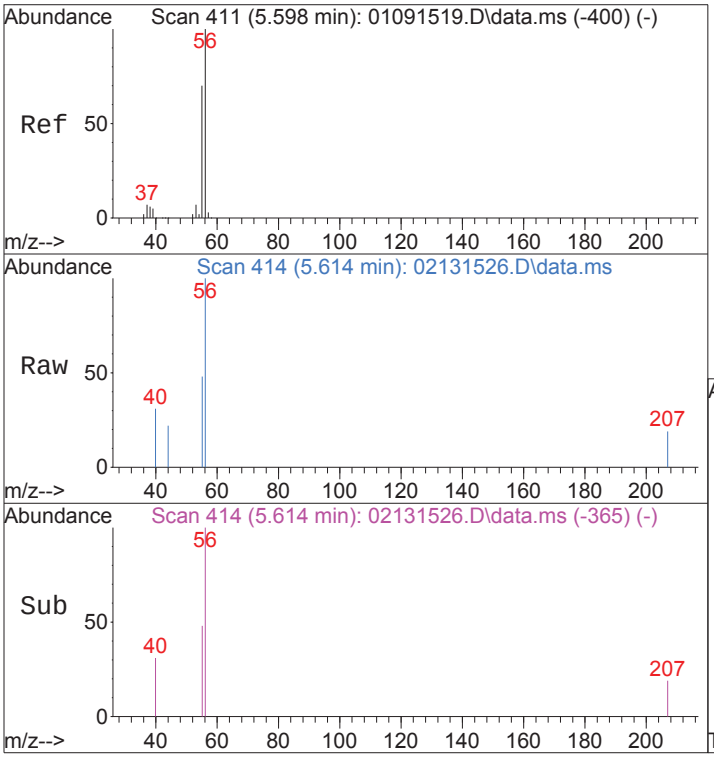


#11
Acetonitrile
Concen: 0.10 ng
RT: 5.47 min Scan# 388
Delta R.T. 0.000 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 41 Resp: 2169

Ion	Ratio	Lower	Upper
41	100		
40	104.5	32.2	72.2#

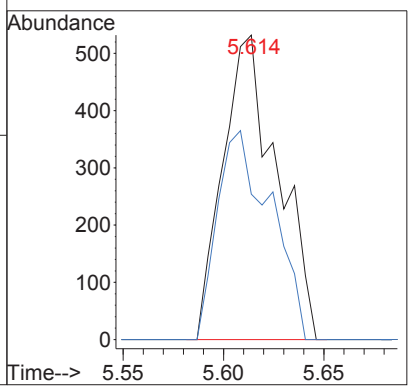


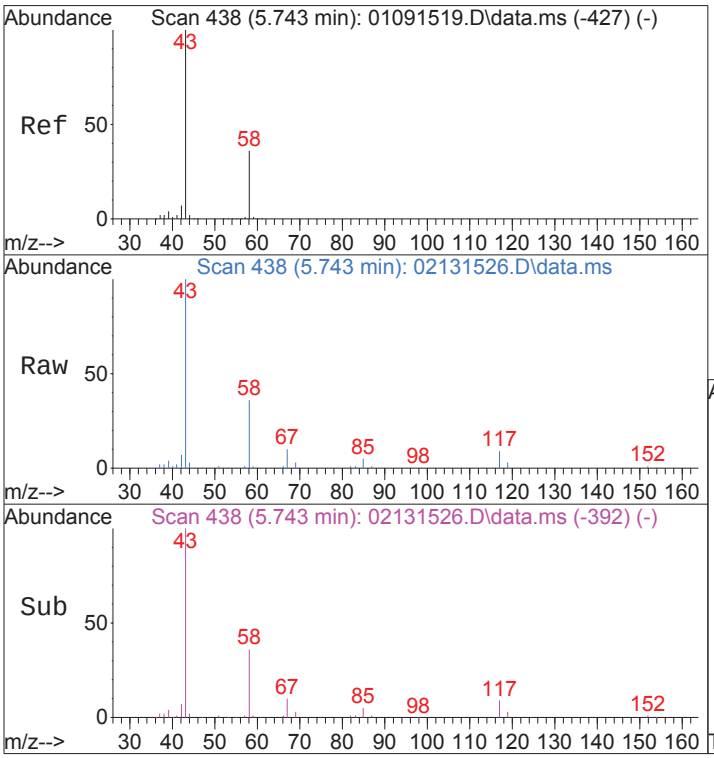


#12
Acrolein
Concen: 0.14 ng
RT: 5.61 min Scan# 414
Delta R.T. 0.016 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 56 Resp: 1004

Ion	Ratio	Lower	Upper
56	100		
55	67.3	49.7	89.7

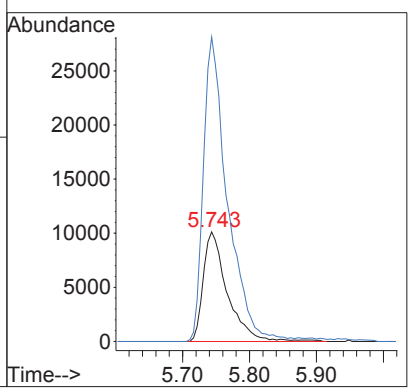


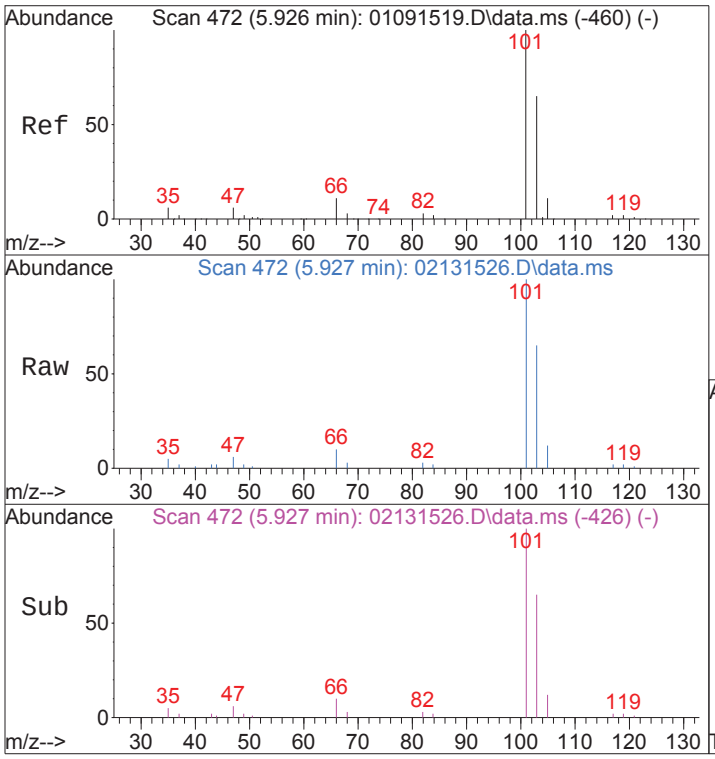


#13
Acetone
Concen: 2.57 ng
RT: 5.74 min Scan# 438
Delta R.T. 0.000 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 58 Resp: 25420

Ion	Ratio	Lower	Upper
58	100		
43	279.8	250.2	310.2

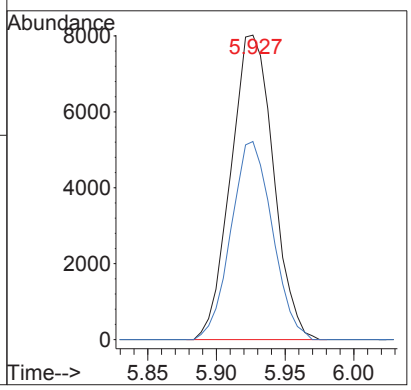


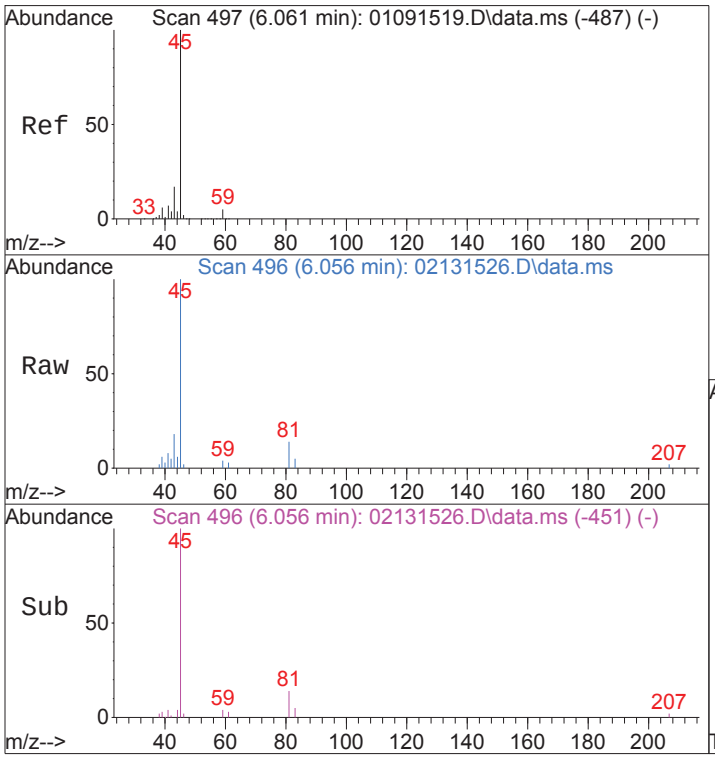


#14
Trichlorofluoromethane
Concen: 0.74 ng
RT: 5.93 min Scan# 472
Delta R.T. 0.000 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion:101 Resp: 17287

Ion	Ratio	Lower	Upper
101	100		
103	63.1	45.5	85.5

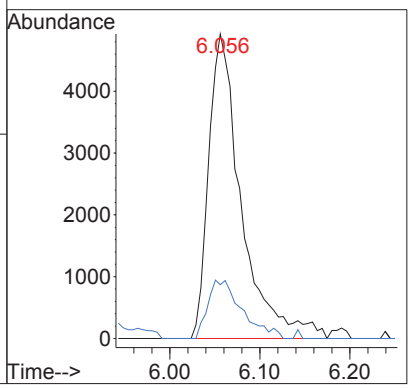


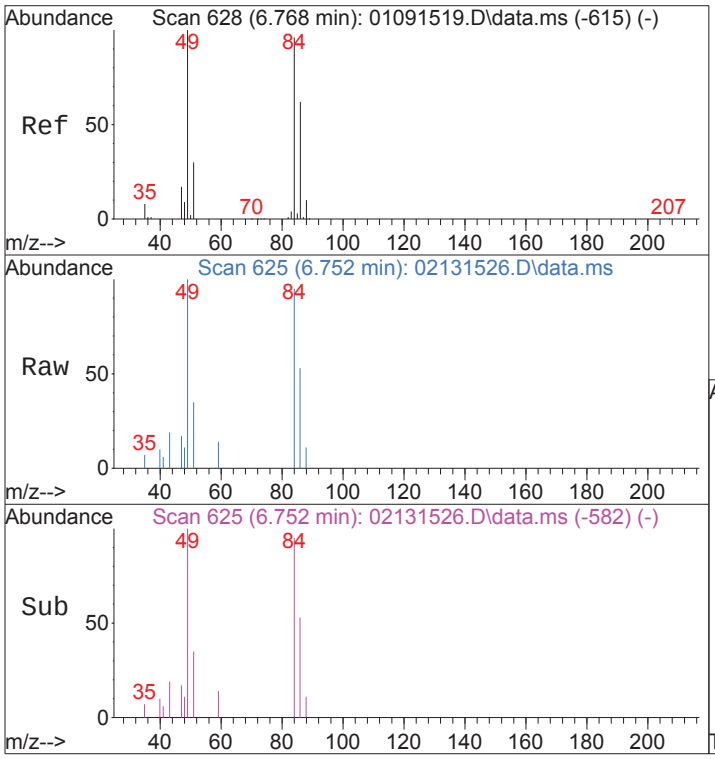


#15
2-Propanol (Isopropanol)
Concen: 0.40 ng
RT: 6.06 min Scan# 496
Delta R.T. -0.005 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 45 Resp: 12410

Ion	Ratio	Lower	Upper
45	100		
43	20.1	0.0	37.3

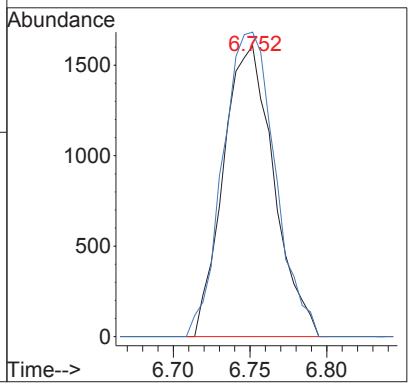


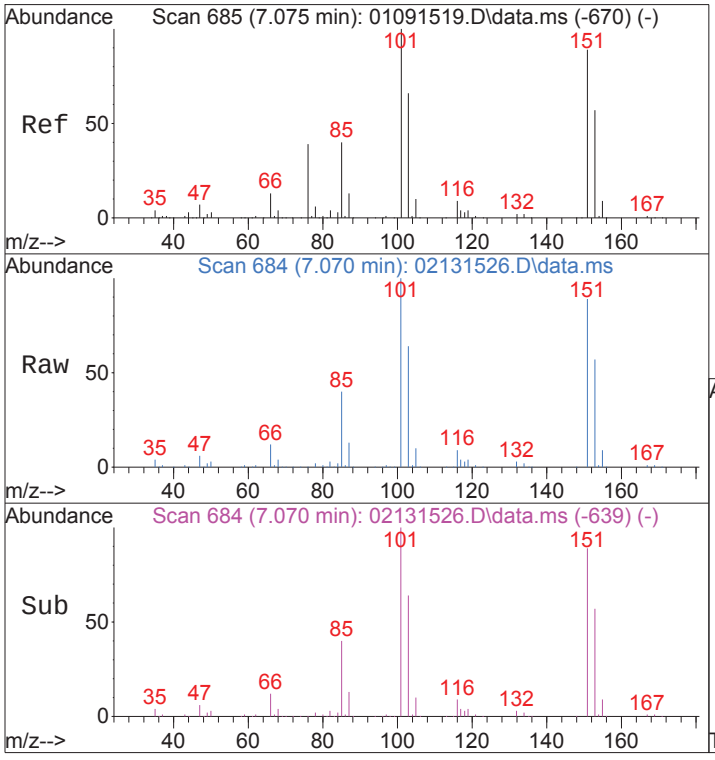


#19
Methylene Chloride
Concen: 0.23 ng
RT: 6.75 min Scan# 625
Delta R.T. -0.016 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 84 Resp: 3673

Ion	Ratio	Lower	Upper
84	100		
49	108.5	82.1	132.1

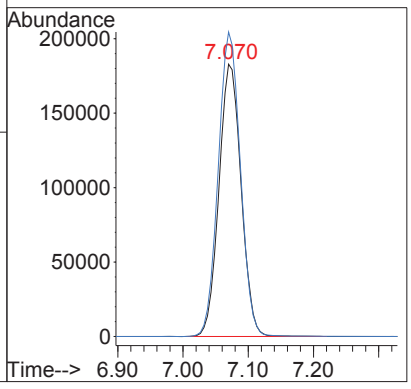


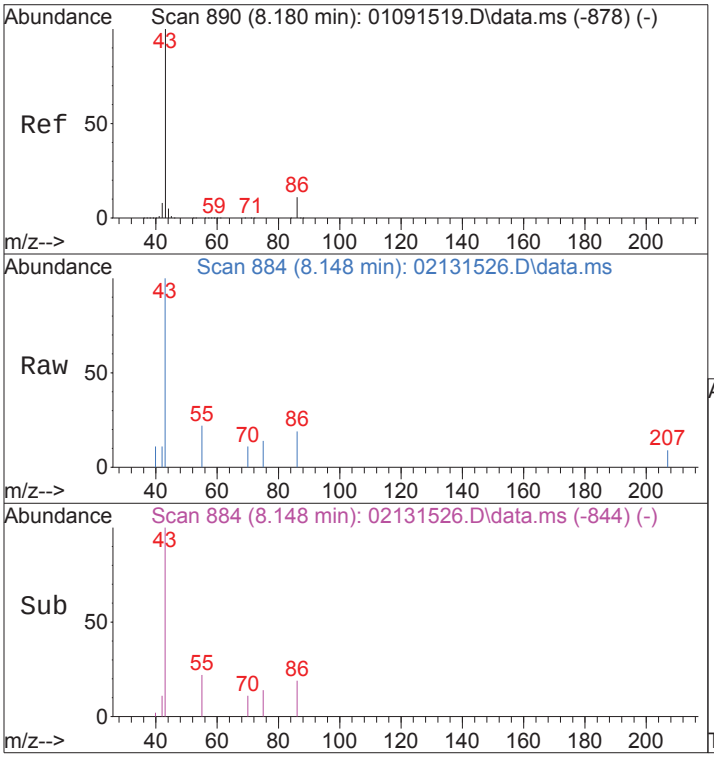


#21
Trichlorotrifluoroethane
Concen: 32.24 ng
RT: 7.07 min Scan# 684
Delta R.T. -0.005 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion:151 Resp: 431948

Ion	Ratio	Lower	Upper
151	100		
101	111.8	91.9	131.9

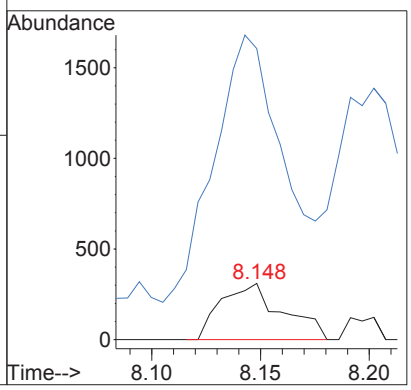


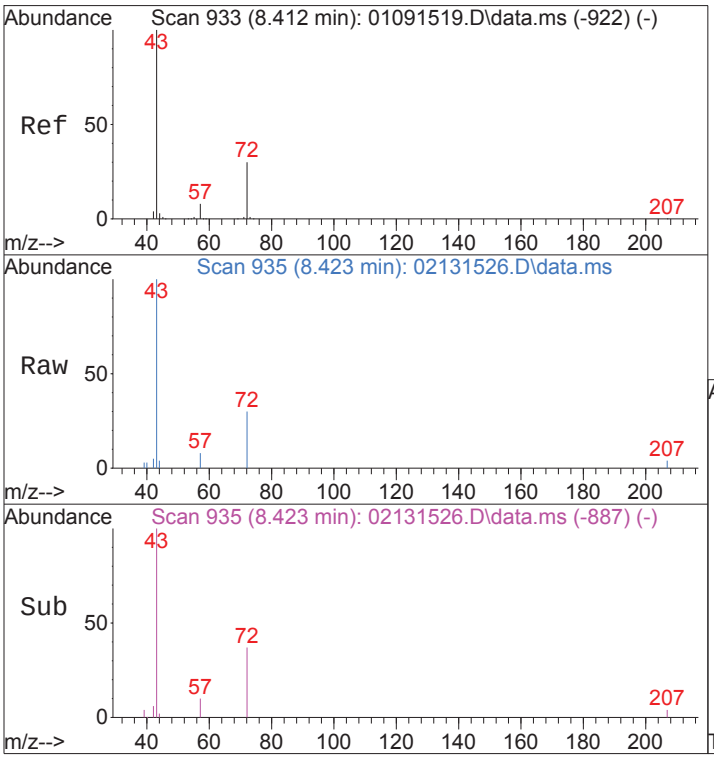


#26
Vinyl Acetate
Concen: 0.19 ng
RT: 8.15 min Scan# 884
Delta R.T. -0.032 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 86 Resp: 609

Ion	Ratio	Lower	Upper
86	100		
43	677.0	927.5	967.5#

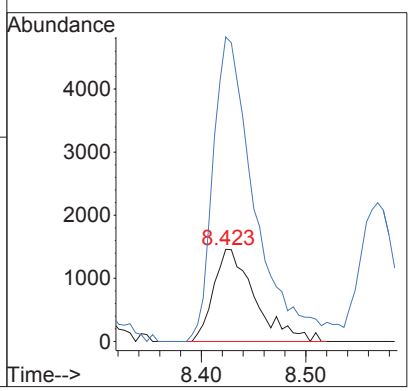


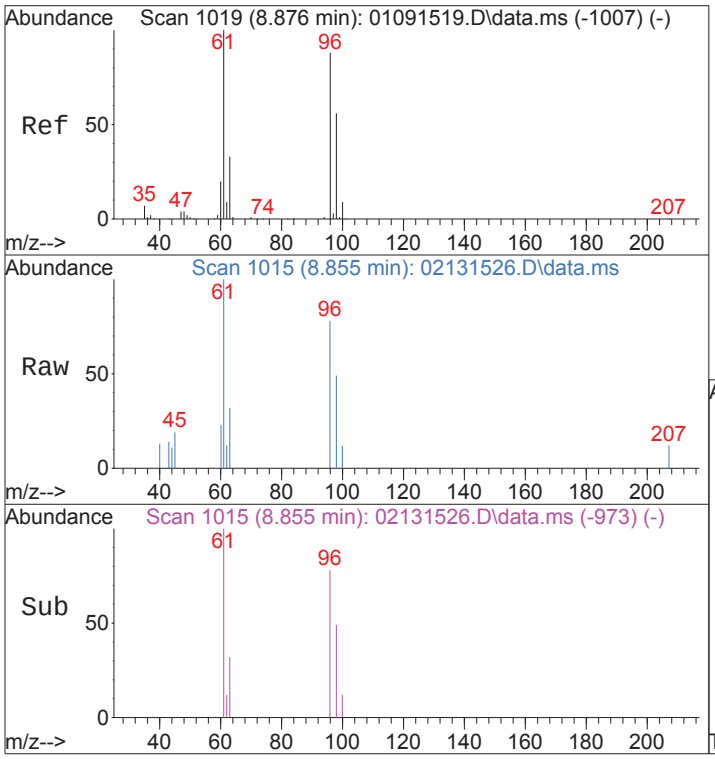


#27
2-Butanone (MEK)
Concen: 0.45 ng
RT: 8.42 min Scan# 935
Delta R.T. 0.011 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 72 Resp: 4021

Ion	Ratio	Lower	Upper
72	100		
43	339.2	315.1	355.1

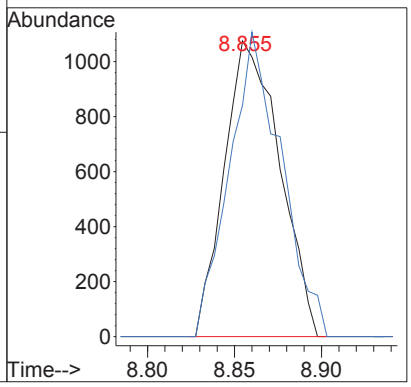


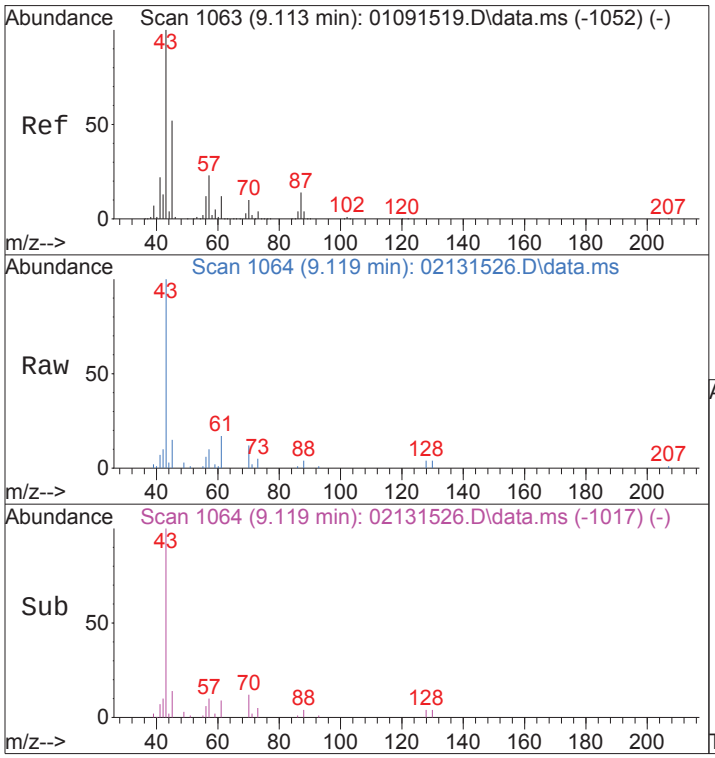


#28
cis-1,2-Dichloroethene
Concen: 0.12 ng
RT: 8.85 min Scan# 1015
Delta R.T. -0.021 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 61 Resp: 2381

Ion	Ratio	Lower	Upper
61	100		
96	96.5	68.3	108.3

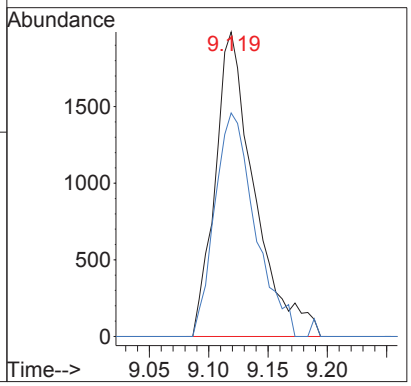


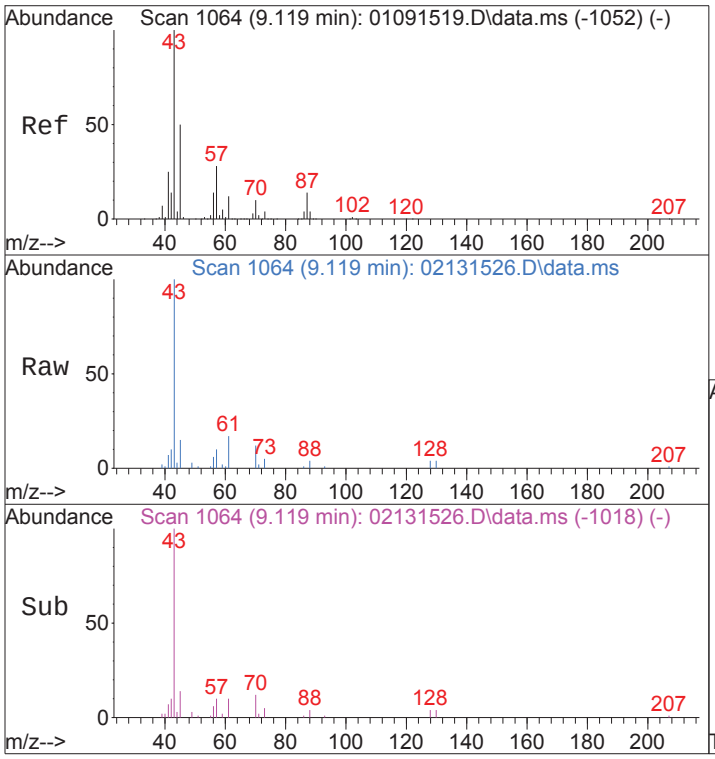


#30
Ethyl Acetate
Concen: 0.94 ng
RT: 9.12 min Scan# 1064
Delta R.T. 0.005 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 61 Resp: 4568

Ion	Ratio	Lower	Upper
61	100		
70	75.5	64.3	104.3

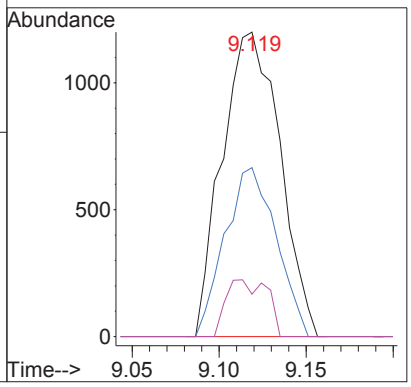


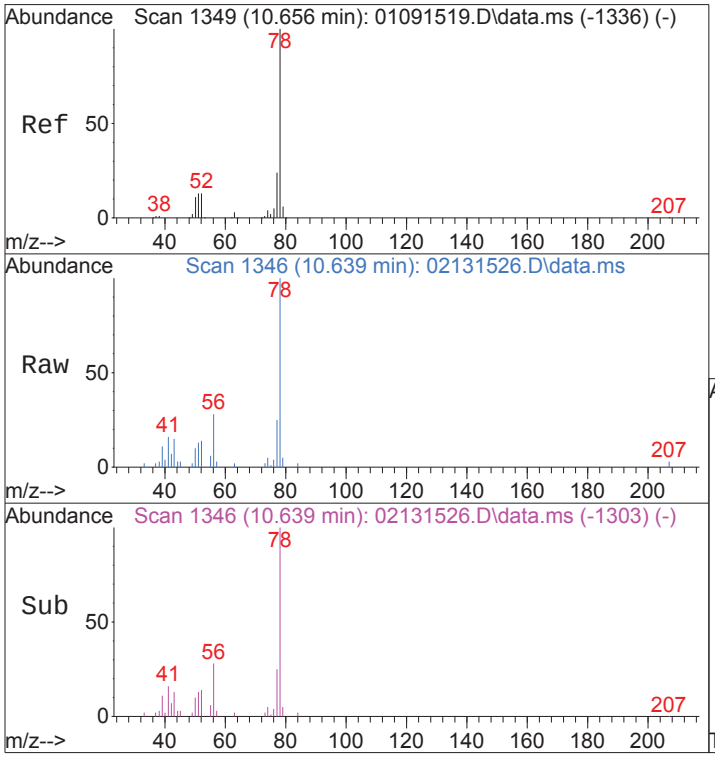


#31
n-Hexane
Concen: 0.12 ng
RT: 9.12 min Scan# 1064
Delta R.T. 0.000 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 57 Resp: 2769

Ion	Ratio	Lower	Upper
57	100		
56	49.1	40.9	61.3
86	13.3	13.0	19.4

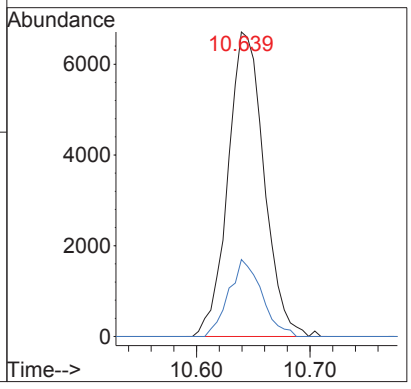


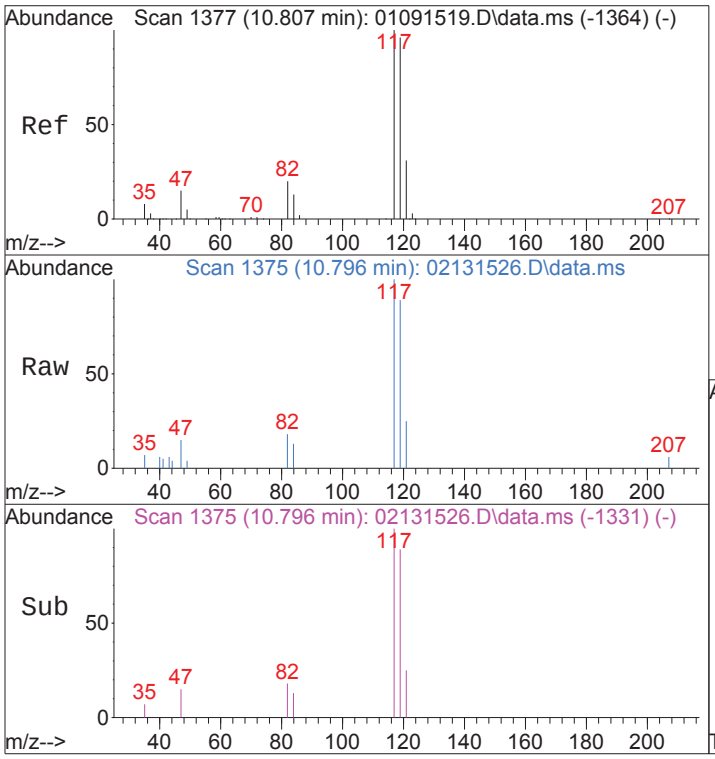


#41
Benzene
Concen: 0.23 ng
RT: 10.64 min Scan# 1346
Delta R.T. -0.016 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 78 Resp: 14809

Ion	Ratio	Lower	Upper
78	100		
77	23.2	3.6	43.6

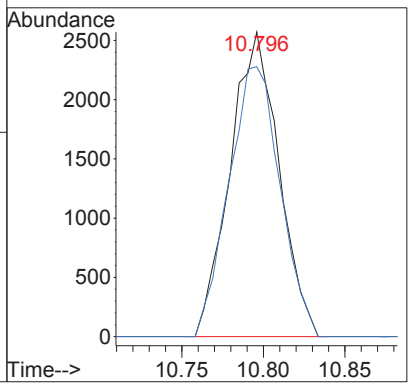


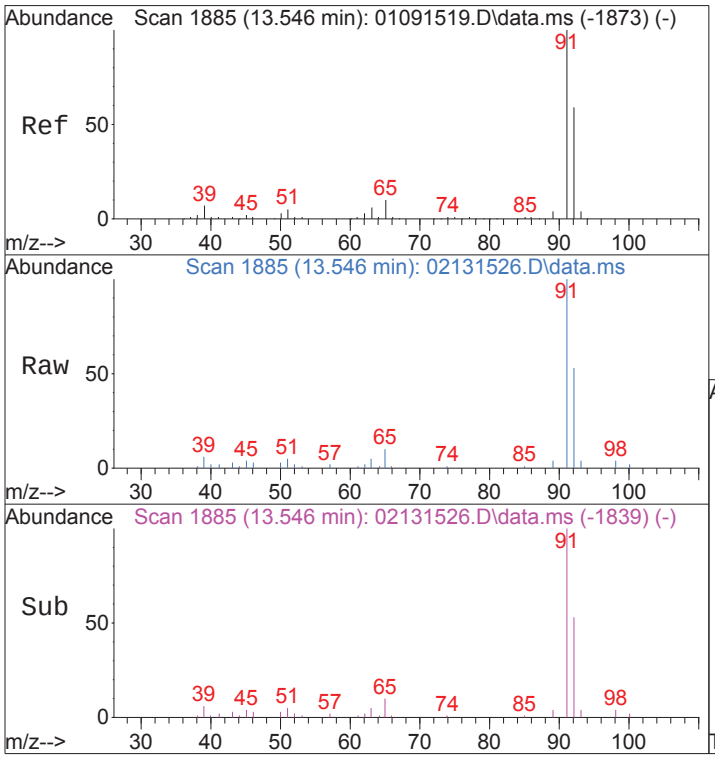


#42
Carbon Tetrachloride
Concen: 0.28 ng
RT: 10.80 min Scan# 1375
Delta R.T. -0.011 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion:117 Resp: 5331

Ion	Ratio	Lower	Upper
117	100		
119	93.8	76.6	116.6

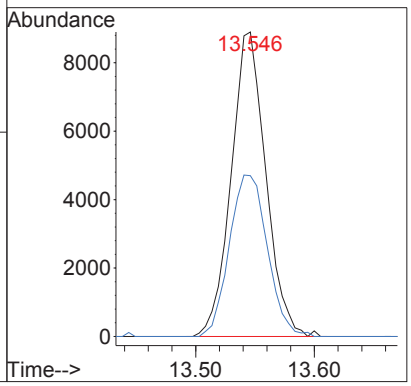




#58
Toluene
Concen: 0.26 ng
RT: 13.55 min Scan# 1885
Delta R.T. 0.000 min
Lab File: 02131526.D
Acq: 13 Feb 2015 20:33

Tgt Ion: 91 Resp: 18061

Ion	Ratio	Lower	Upper
91	100		
92	58.3	39.0	79.0



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131526.D
Acq On : 13 Feb 2015 20:33 Operator: SC
Sample : P1500369-002 (1000ml)
Misc : S29-01081512
ALS Vial : 6 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:23:14 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

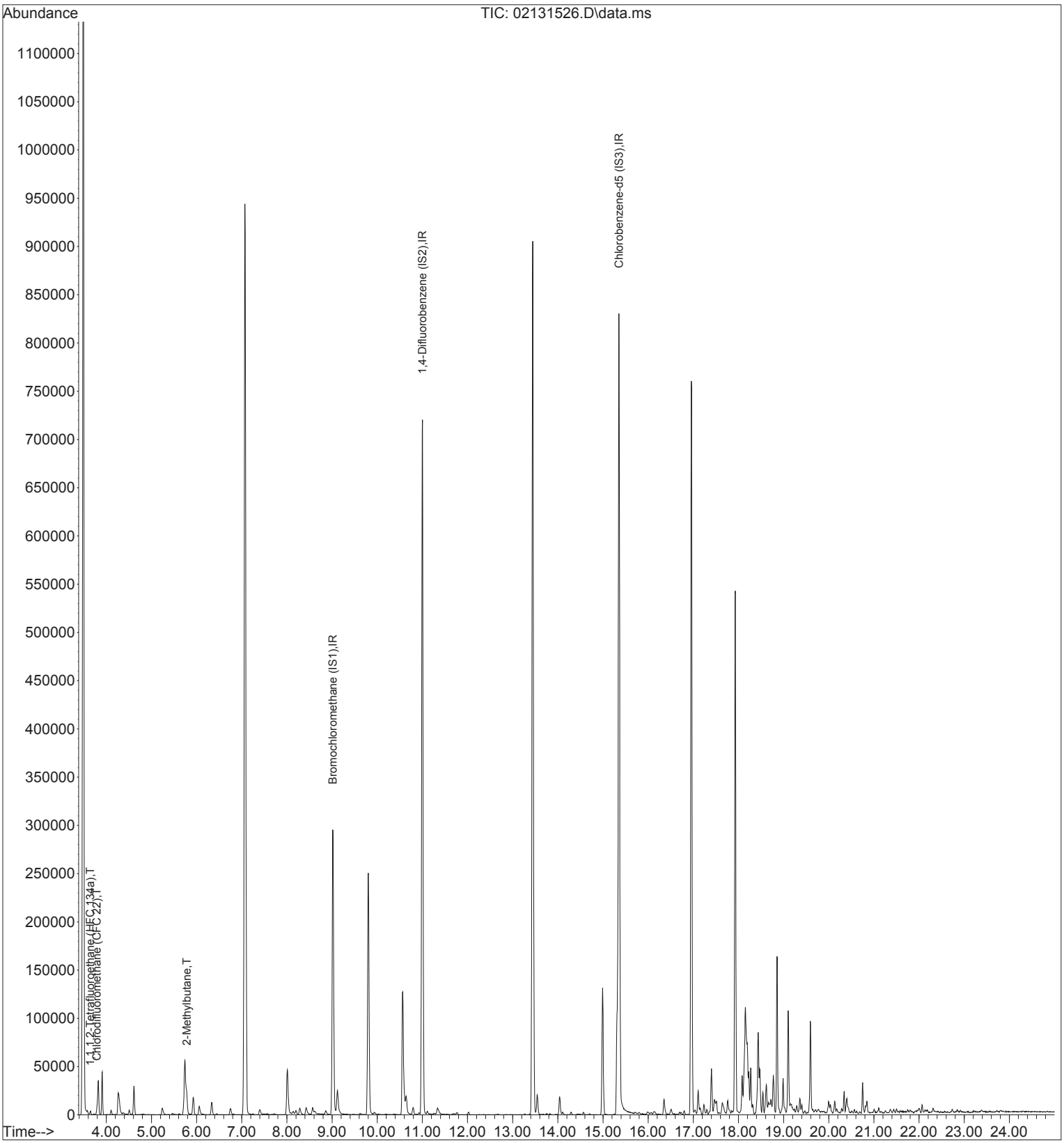
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	148708	12.500	ng		-0.02
16) 1,4-Difluorobenzene (IS2)	11.00	114	766937	12.500	ng		0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	300006	12.500	ng		0.00
Target Compounds							Qvalue
2) Chloropentafluoroethane	3.59	85	367	N.D.			
3) 1,1,1,2-Tetrafluoroeth...	3.65	83	1639	0.148	ng	#	64
4) 1,1-Difluoroethane	3.73	65	245	N.D.			
5) Chlorodifluoromethane ...	3.79	67	1053	0.324	ng		74
6) 1-Chloro-1,1-Difluoroe...	4.10	65	1069	N.D.			
7) Dichlorofluoromethane ...	0.00	67	0	N.D.			
8) Vinylbromide	0.00	108	0	N.D.			
9) 2,2-Dichloro-1,1,1-tri...	5.73	83	841	N.D.			
10) 2-Methylbutane	5.78	57	6990	0.585	ng	#	73
11) Methyl Acetate	6.76	43	1016	N.D.			
12) 2-Methylpentane	8.20	71	1096	N.D.			
13) 2,2-Dichloropropane	0.00	77	0	N.D.			
14) 1,1-Dichloropropene	0.00	75	0	N.D.			
15) Thiophene	10.79	84	628	N.D.			
17) 2,3-Dimethylpentane	11.19	56	394	N.D.			
18) Dibromomethane	0.00	174	0	N.D.			
20) Methyl Cyclohexane	12.68	55	159	N.D.			
21) 1,3-Dichloropropane	0.00	76	0	N.D.	d		
22) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.			
23) 1-Chlorohexane	0.00	91	0	N.D.			
24) 1,2,3-Trichloropropane	0.00	75	0	N.D.			
25) Bromobenzene	17.10	77	35	N.D.			
26) 2-Chlorotoluene	17.64	91	1343	N.D.			
27) 4-Chlorotoluene	17.64	91	1343	N.D.			
28) Indan	18.96	117	865	N.D.			
29) Indene	19.06	115	167	N.D.			
30) 1,2,4,5-Tetramethylben...	19.99	119	2421	N.D.			
31) 1,2,3,4-Tetramethylben...	20.04	119	4068	N.D.			
32) 1,2,3,5-Tetramethylben...	20.43	119	2812	N.D.			
33) 1,2,3-Trichlorobenzene	0.00	180	0	N.D.			

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131526.D
Acq On : 13 Feb 2015 20:33 Operator: SC
Sample : P1500369-002 (1000ml)
Misc : S29-01081512
ALS Vial : 6 Sample Multiplier: 1

Quant Time: Feb 16 10:23:14 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131527.D
Acq On : 13 Feb 2015 21:07 Operator: SC
Sample : P1500369-003 (1000ml)
Misc : S29-01081512
ALS Vial : 7 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:14:23 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	148873	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	11.00	114	760839	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	294821	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	194565	11.853	ng		-0.02
Spiked Amount 12.500			Recovery = 94.80%				
57) Toluene-d8 (SS2)	13.44	98	736745	12.129	ng		0.00
Spiked Amount 12.500			Recovery = 97.04%				
73) Bromofluorobenzene (SS3)	16.96	174	304969	13.395	ng		0.00
Spiked Amount 12.500			Recovery = 107.12%				
Target Compounds							Qvalue
2) Propene	0.00	42	0	N.D.	d		
3) Dichlorodifluoromethan...	3.90	85	44047	1.516	ng		100
4) Chloromethane	4.10	50	5127	0.275	ng		98
5) 1,2-Dichloro-1,1,2,2-t...	4.26	135	1079	N.D.			
6) Vinyl Chloride	4.37	62	1045	N.D.			
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	4.84	94	259	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	5.23	45	51400	5.467	ng		99
11) Acetonitrile	5.46	41	2823	0.127	ng	#	48
12) Acrolein	5.60	56	2421	0.332	ng		99
13) Acetone	5.74	58	34697	3.507	ng		91
14) Trichlorofluoromethane	5.92	101	19479	0.833	ng		99
15) 2-Propanol (Isopropanol)	6.06	45	9983	0.323	ng		99
16) Acrylonitrile	6.33	53	46	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	6.74	59	964	N.D.			
19) Methylene Chloride	6.75	84	3738	0.238	ng		97
20) 3-Chloro-1-propene (Al...	6.76	41	121	N.D.			
21) Trichlorotrifluoroethane	7.08	151	13505	1.007	ng		99
22) Carbon Disulfide	7.03	76	7586	0.152	ng		95
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	8.00	73	1007	N.D.			
26) Vinyl Acetate	8.14	86	2123	0.661	ng	#	30
27) 2-Butanone (MEK)	8.42	72	5138	0.570	ng		91
28) cis-1,2-Dichloroethene	8.86	61	2755	0.141	ng		96
29) Diisopropyl Ether	9.16	87	33	N.D.			
30) Ethyl Acetate	9.12	61	2520	0.516	ng		92
31) n-Hexane	9.11	57	2037	0.090	ng		89
32) Chloroform	9.16	83	1320	N.D.			
34) Tetrahydrofuran (THF)	9.61	72	313	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	9.91	62	760	N.D.			
38) 1,1,1-Trichloroethane	10.18	97	75	N.D.			
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D.	d		
41) Benzene	10.64	78	15900	0.250	ng		98
42) Carbon Tetrachloride	10.79	117	6020	0.317	ng		100
43) Cyclohexane	10.93	84	725	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	11.45	63	38	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.			
47) Trichloroethene	11.70	130	73	N.D.			
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	11.77	57	2638	N.D.			

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131527.D
Acq On : 13 Feb 2015 21:07 Operator: SC
Sample : P1500369-003 (1000ml)
Misc : S29-01081512
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Feb 16 10:14:23 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

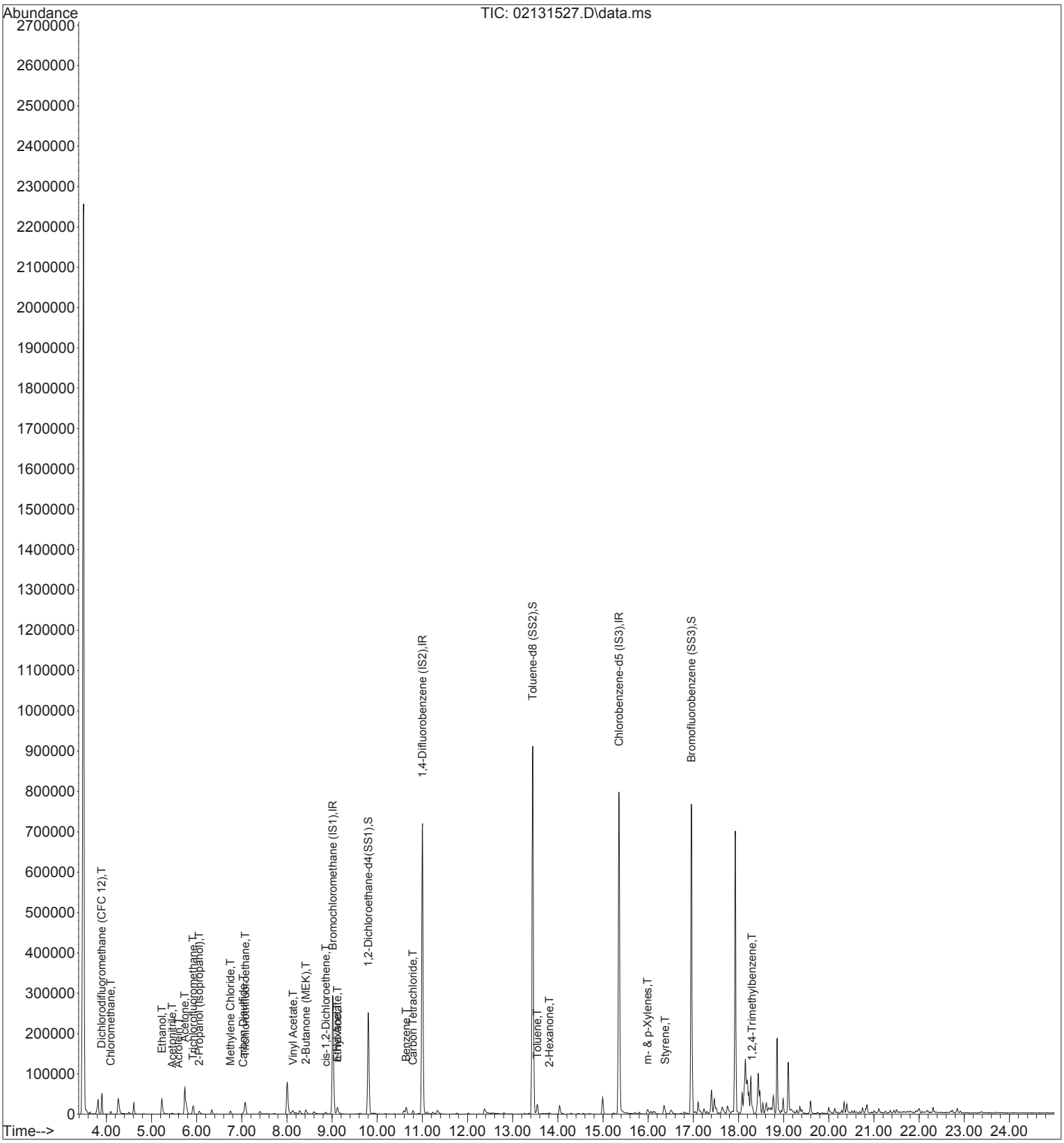
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	12.01	100	38	N.D.	
51) n-Heptane	12.02	71	610	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	12.61	58	629	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	13.55	91	20883	0.306 ng	99
59) 2-Hexanone	13.81	43	2919	0.106 ng	81
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	14.46	43	1810	N.D.	
63) n-Octane	14.57	57	388	N.D.	
64) Tetrachloroethene	14.70	166	429	N.D.	
65) Chlorobenzene	15.39	112	82	N.D.	
66) Ethylbenzene	15.81	91	4390	N.D.	
67) m- p- ylenes	15.98	91	10752	0.177 ng	98
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	16.38	104	4794	0.101 ng	96
70) o- ylene	16.49	91	4206	N.D.	
71) n-Nonane	16.73	43	809	N.D.	
72) 1,1,2,2-Tetrachloroethane	16.52	83	272	N.D.	
74) Cumene	17.10	105	334	N.D.	
75) alpha-Pinene	17.52	93	2060	N.D.	
76) n-Propylbenzene	17.64	91	2241	N.D.	
77) 3-Ethyltoluene	17.75	105	4754	N.D.	
78) 4-Ethyltoluene	17.79	105	2433	N.D.	
79) 1,3,5-Trimethylbenzene	17.87	105	1410	N.D.	
80) alpha-Methylstyrene	18.03	118	467	N.D.	
81) 2-Ethyltoluene	18.08	105	1678	N.D.	
82) 1,2,4-Trimethylbenzene	18.30	105	7272	0.110 ng	88
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	18.43	91	175	N.D.	
85) 1,3-Dichlorobenzene	18.52	146	301	N.D.	
86) 1,4-Dichlorobenzene	18.52	146	301	N.D.	
87) sec-Butylbenzene	18.60	105	203	N.D.	
88) 4-Isopropyltoluene (p-...	18.75	119	1340	N.D.	
89) 1,2,3-Trimethylbenzene	18.75	105	1688	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	18.91	68	1370	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	19.75	57	961	N.D.	
94) 1,2,4-Trichlorobenzene	20.70	180	76	N.D.	
95) Naphthalene	20.81	128	7845	N.D.	
96) n-Dodecane	0.00	57	0	N.D. d	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D. d	
99) tert-Butylbenzene	18.27	119	2913	N.D.	
100) n-Butylbenzene	19.18	91	2997	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131527.D
Acq On : 13 Feb 2015 21:07 Operator: SC
Sample : P1500369-003 (1000ml)
Misc : S29-01081512
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Feb 16 10:14:23 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131527.D
Acq On : 13 Feb 2015 21:07 Operator: SC
Sample : P1500369-003 (1000ml)
Misc : S29-01081512
ALS Vial : 7 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:14:23 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

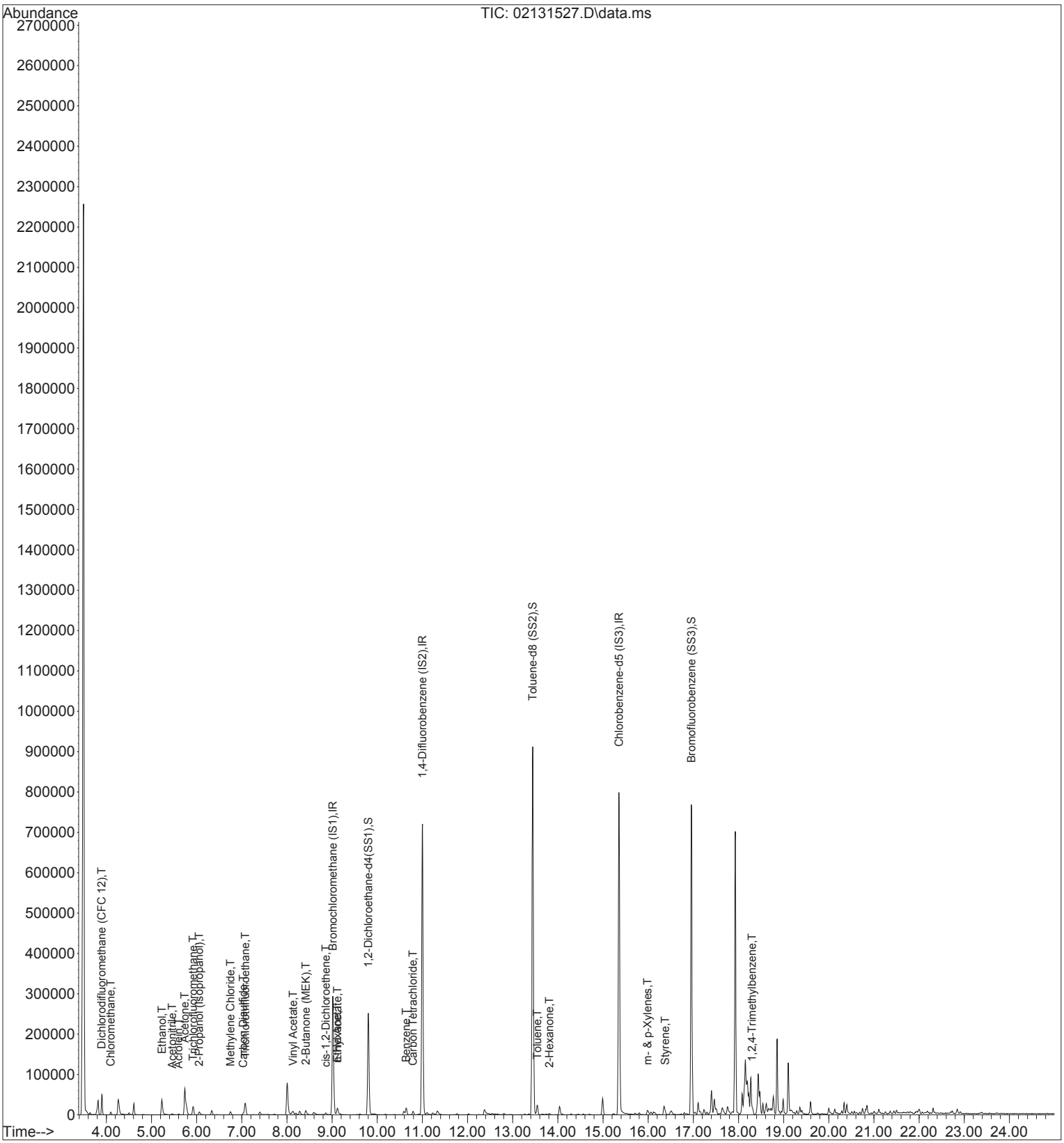
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	148873	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	11.00	114	760839	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	294821	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	194565	11.853	ng		-0.02
Spiked Amount 12.500			Recovery = 94.80%				
57) Toluene-d8 (SS2)	13.44	98	736745	12.129	ng		0.00
Spiked Amount 12.500			Recovery = 97.04%				
73) Bromofluorobenzene (SS3)	16.96	174	304969	13.395	ng		0.00
Spiked Amount 12.500			Recovery = 107.12%				
Target Compounds							Qvalue
3) Dichlorodifluoromethan...	3.90	85	44047	1.516	ng		100
4) Chloromethane	4.10	50	5127	0.275	ng		98
10) Ethanol	5.23	45	51400	5.467	ng		99
11) Acetonitrile	5.46	41	2823	0.127	ng	#	48
12) Acrolein	5.60	56	2421	0.332	ng		99
13) Acetone	5.74	58	34697	3.507	ng		91
14) Trichlorofluoromethane	5.92	101	19479	0.833	ng		99
15) 2-Propanol (Isopropanol)	6.06	45	9983	0.323	ng		99
19) Methylene Chloride	6.75	84	3738	0.238	ng		97
21) Trichlorotrifluoroethane	7.08	151	13505	1.007	ng		99
22) Carbon Disulfide	7.03	76	7586	0.152	ng		95
26) Vinyl Acetate	8.14	86	2123	0.661	ng	#	30
27) 2-Butanone (MEK)	8.42	72	5138	0.570	ng		91
28) cis-1,2-Dichloroethene	8.86	61	2755	0.141	ng		96
30) Ethyl Acetate	9.12	61	2520	0.516	ng		92
31) n-Hexane	9.11	57	2037	0.090	ng		89
41) Benzene	10.64	78	15900	0.250	ng		98
42) Carbon Tetrachloride	10.79	117	6020	0.317	ng		100
58) Toluene	13.55	91	20883	0.306	ng		99
59) 2-Hexanone	13.81	43	2919	0.106	ng		81
67) m- p- ylenes	15.98	91	10752	0.177	ng		98
69) Styrene	16.38	104	4794	0.101	ng		96
82) 1,2,4-Trimethylbenzene	18.30	105	7272	0.110	ng		88

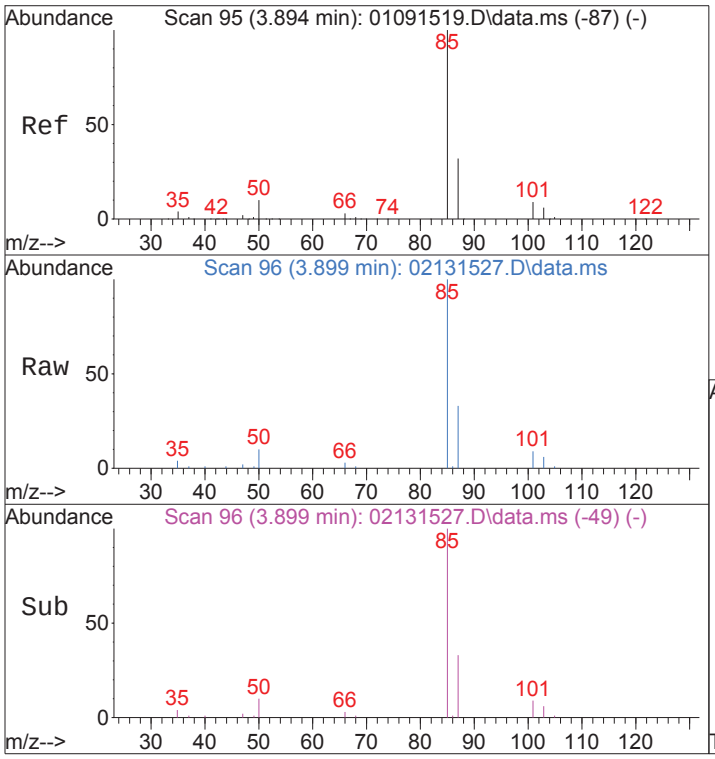
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131527.D
Acq On : 13 Feb 2015 21:07 Operator: SC
Sample : P1500369-003 (1000ml)
Misc : S29-01081512
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Feb 16 10:14:23 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

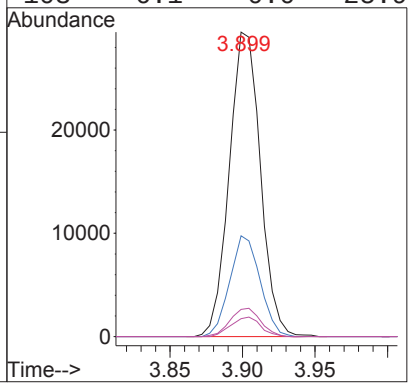


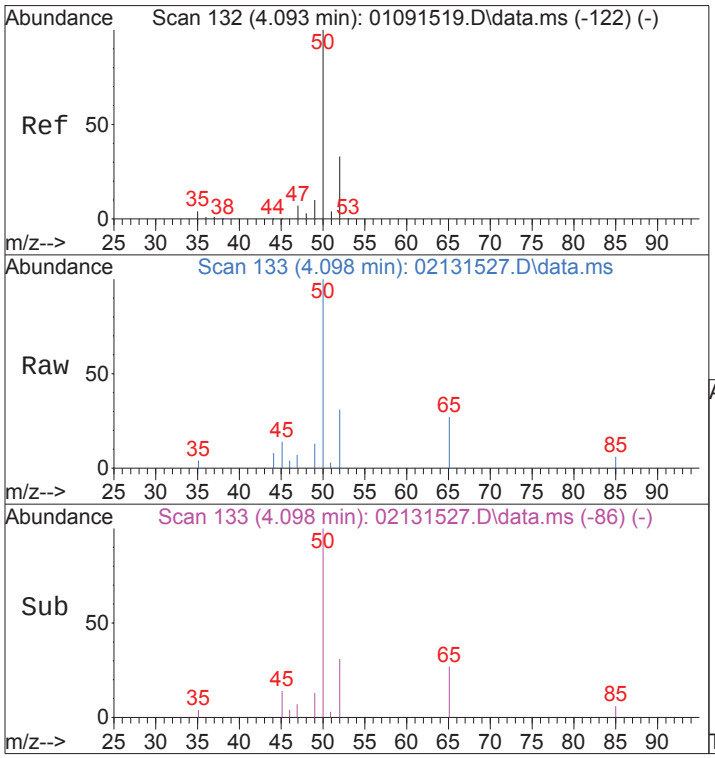


#3
Dichlorodifluoromethane (CFC 12)
Concen: 1.52 ng
RT: 3.90 min Scan# 96
Delta R.T. 0.005 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 85 Resp: 44047

Ion	Ratio	Lower	Upper
85	100		
87	32.1	12.4	52.4
101	9.1	0.0	29.0
103	6.1	0.0	25.9

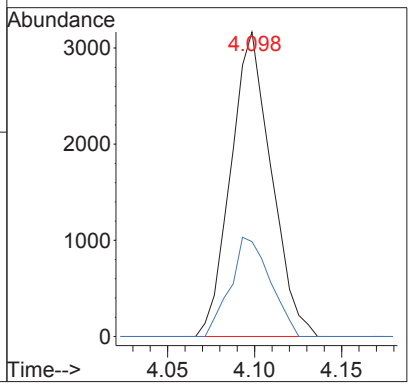


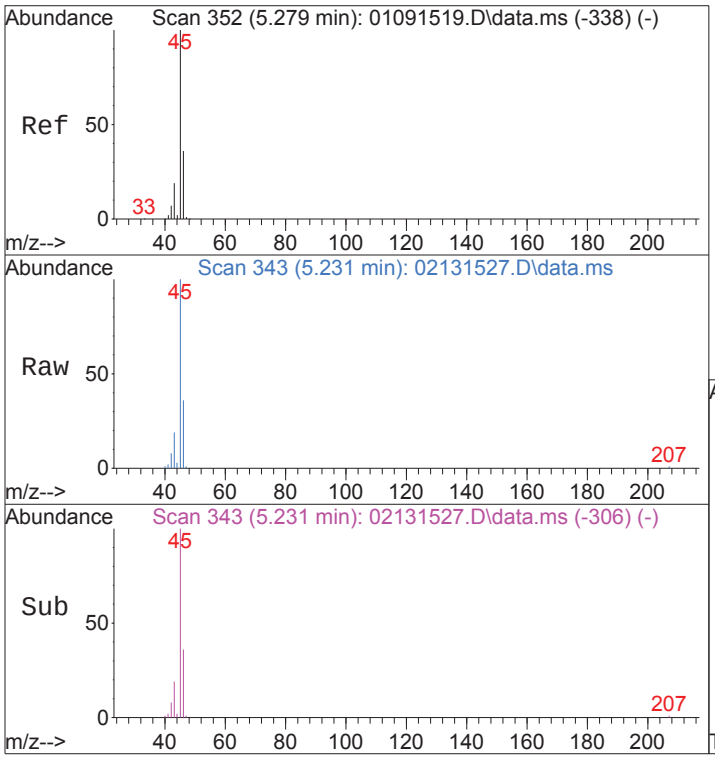


#4
Chloromethane
Concen: 0.27 ng
RT: 4.10 min Scan# 133
Delta R.T. 0.005 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 50 Resp: 5127

Ion	Ratio	Lower	Upper
50	100		
52	32.0	13.3	53.3

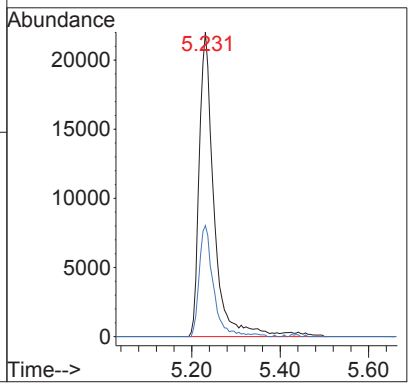


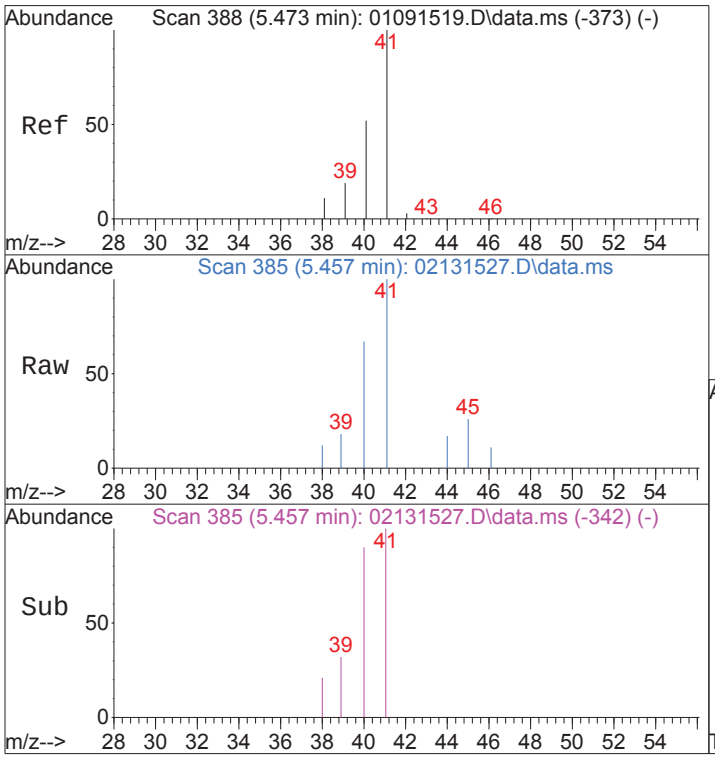


#10
Ethanol
Concen: 5.47 ng
RT: 5.23 min Scan# 343
Delta R.T. -0.048 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 45 Resp: 51400

Ion	Ratio	Lower	Upper
45	100		
46	35.0	15.6	55.6

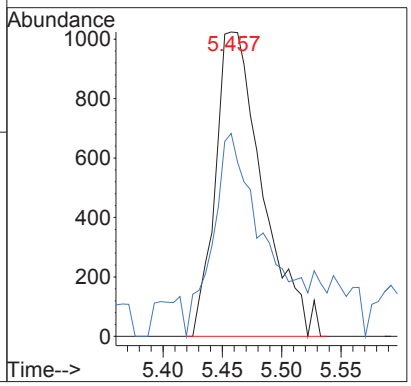


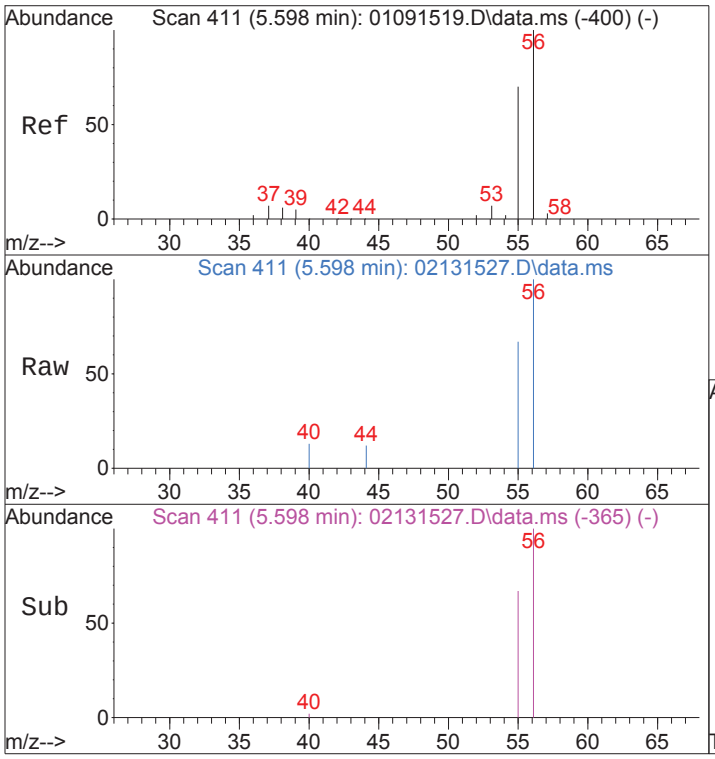


#11
Acetonitrile
Concen: 0.13 ng
RT: 5.46 min Scan# 385
Delta R.T. -0.016 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 41 Resp: 2823

Ion	Ratio	Lower	Upper
41	100		
40	88.8	32.2	72.2#

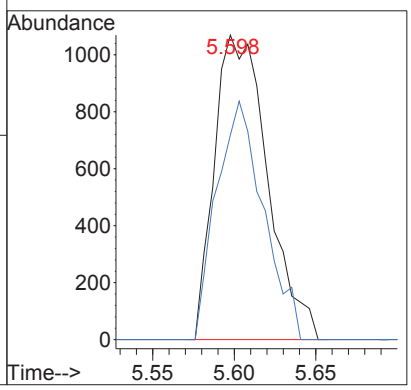


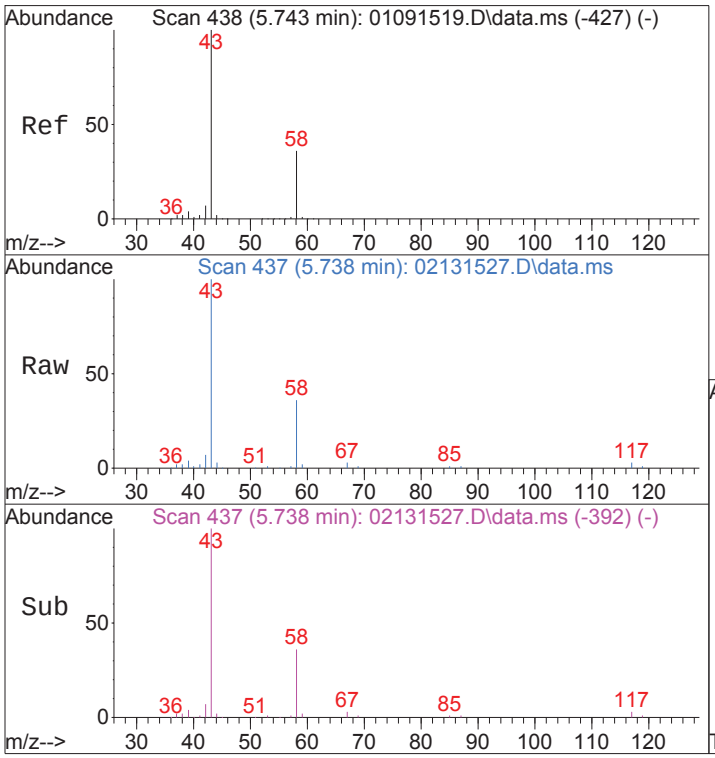


#12
Acrolein
Concen: 0.33 ng
RT: 5.60 min Scan# 411
Delta R.T. 0.000 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 56 Resp: 2421

Ion	Ratio	Lower	Upper
56	100		
55	69.2	49.7	89.7

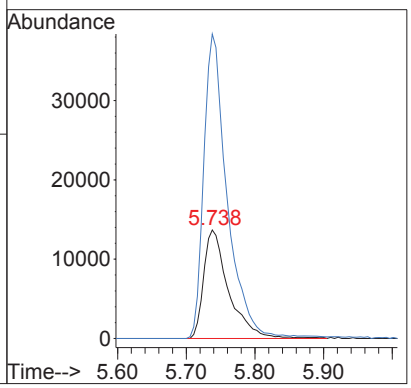


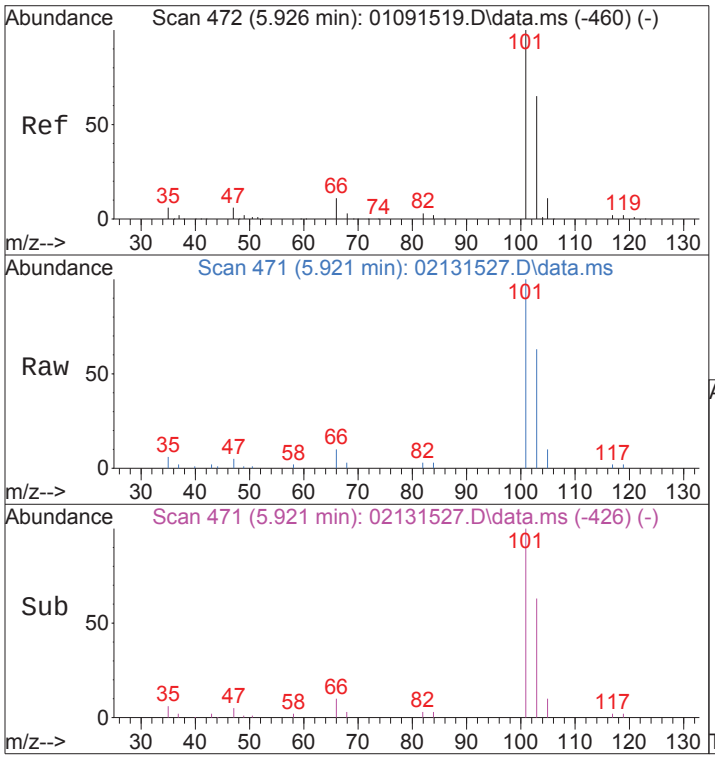


#13
Acetone
Concen: 3.51 ng
RT: 5.74 min Scan# 437
Delta R.T. -0.005 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 58 Resp: 34697

Ion	Ratio	Lower	Upper
58	100		
43	264.0	250.2	310.2

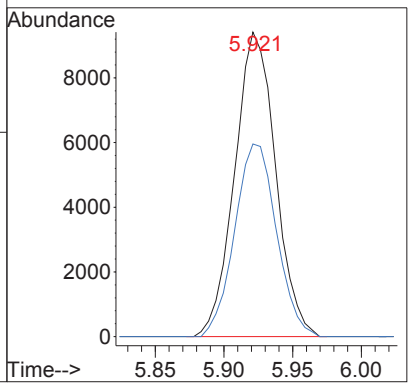


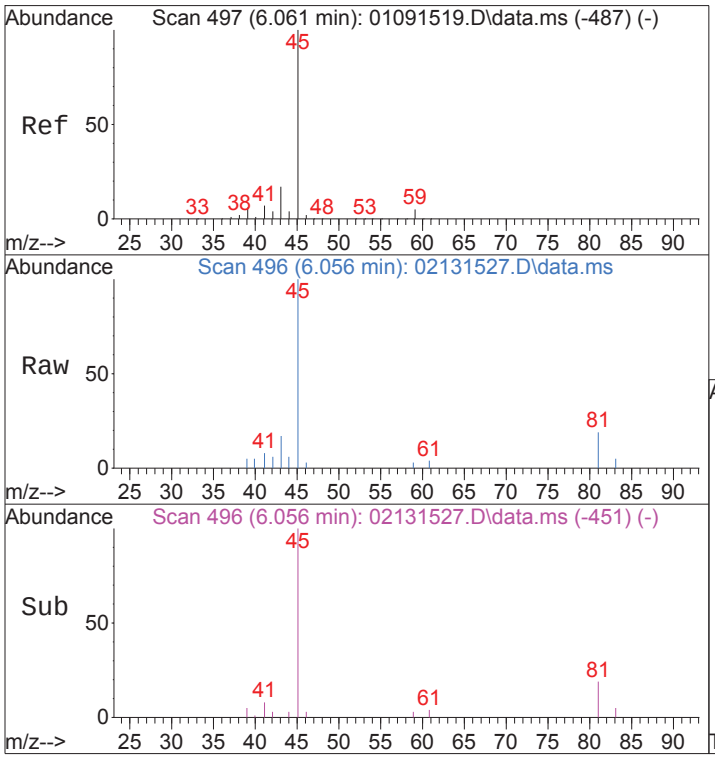


#14
Trichlorofluoromethane
Concen: 0.83 ng
RT: 5.92 min Scan# 471
Delta R.T. -0.005 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion:101 Resp: 19479

Ion	Ratio	Lower	Upper
101	100		
103	64.7	45.5	85.5

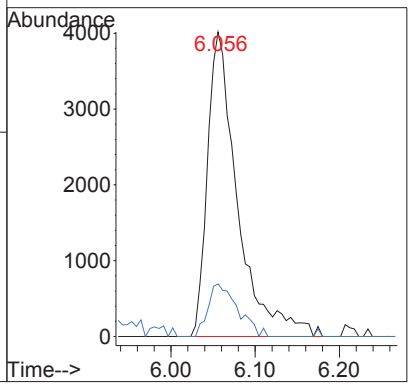


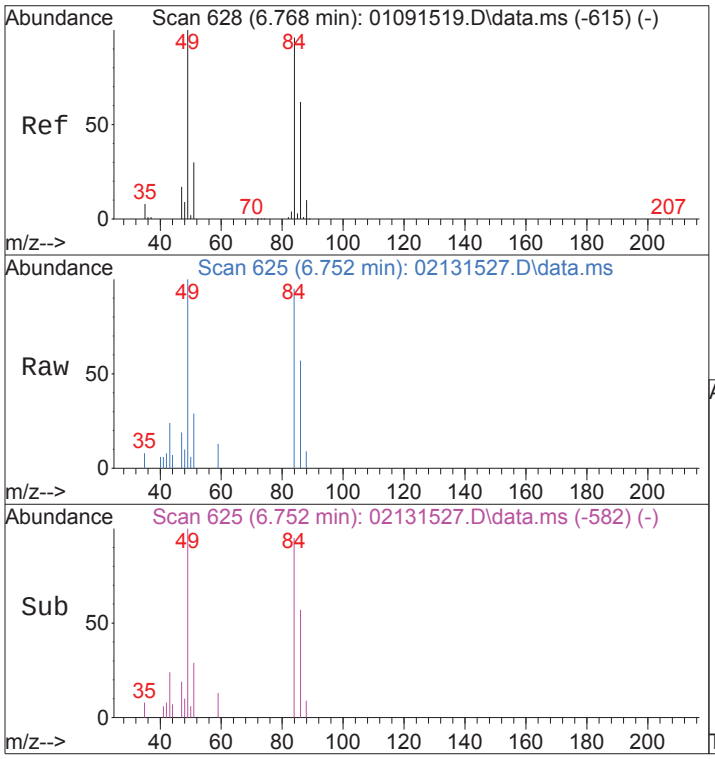


#15
2-Propanol (Isopropanol)
Concen: 0.32 ng
RT: 6.06 min Scan# 496
Delta R.T. -0.005 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 45 Resp: 9983

Ion	Ratio	Lower	Upper
45	100		
43	17.1	0.0	37.3

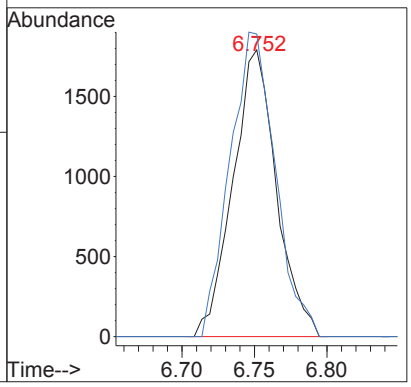


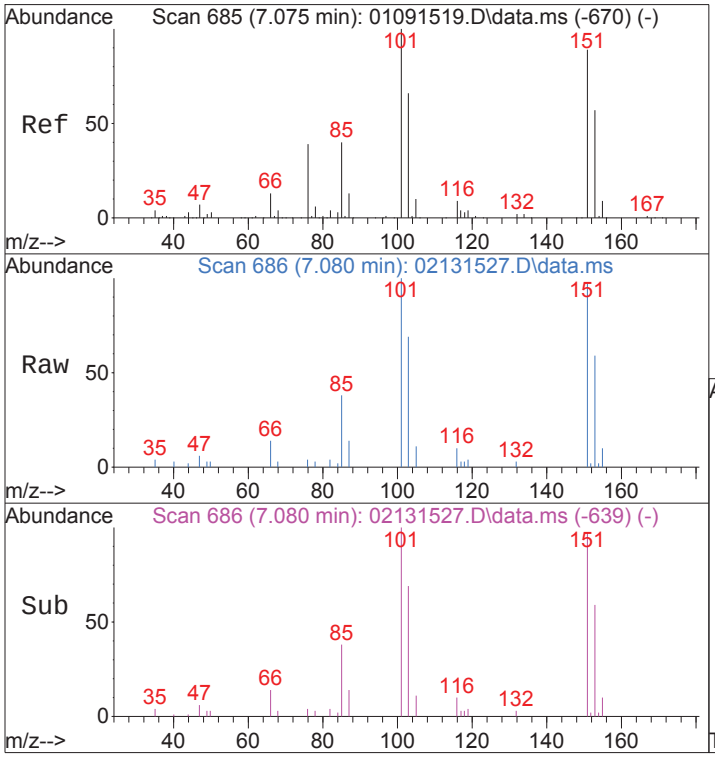


#19
Methylene Chloride
Concen: 0.24 ng
RT: 6.75 min Scan# 625
Delta R.T. -0.016 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 84 Resp: 3738

Ion	Ratio	Lower	Upper
84	100		
49	110.6	82.1	132.1

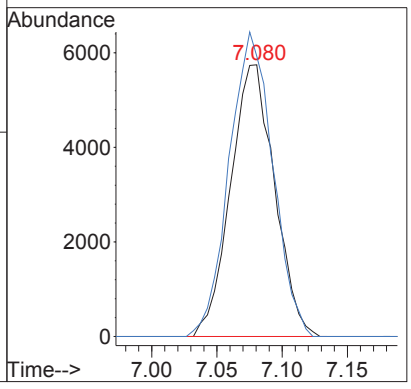


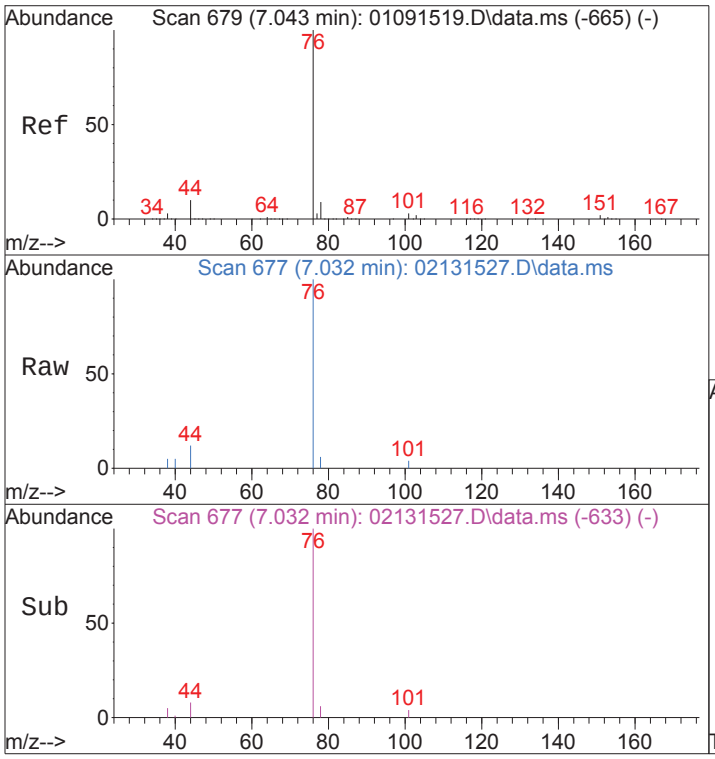


#21
Trichlorotrifluoroethane
Concen: 1.01 ng
RT: 7.08 min Scan# 686
Delta R.T. 0.005 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion:151 Resp: 13505

Ion	Ratio	Lower	Upper
151	100		
101	110.8	91.9	131.9

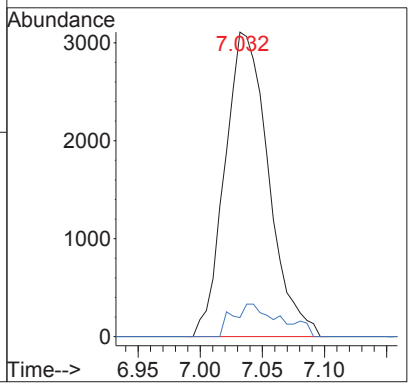


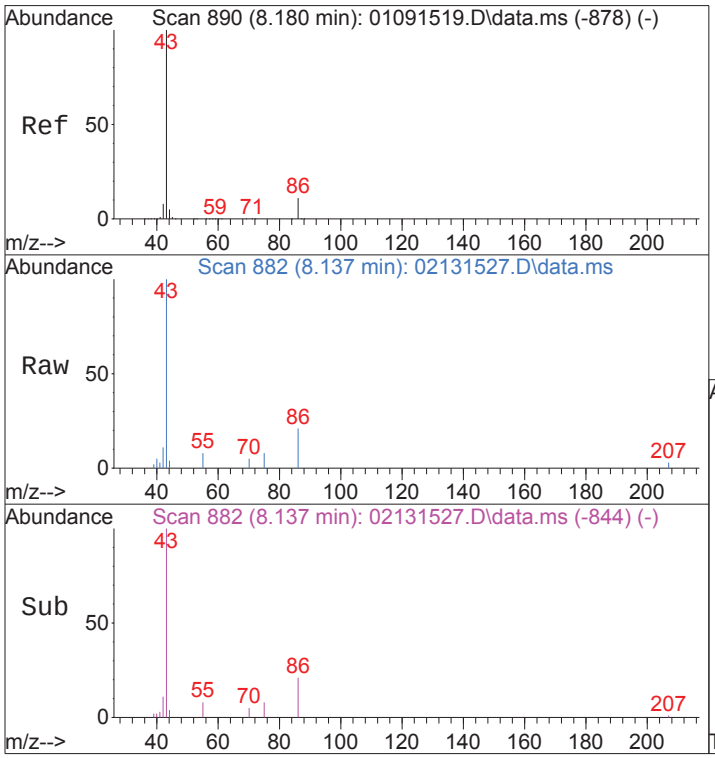


#22
Carbon Disulfide
Concen: 0.15 ng
RT: 7.03 min Scan# 677
Delta R.T. -0.011 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 76 Resp: 7586

Ion	Ratio	Lower	Upper
76	100		
78	11.6	0.0	29.6

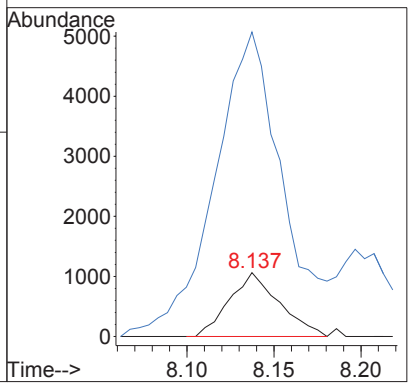


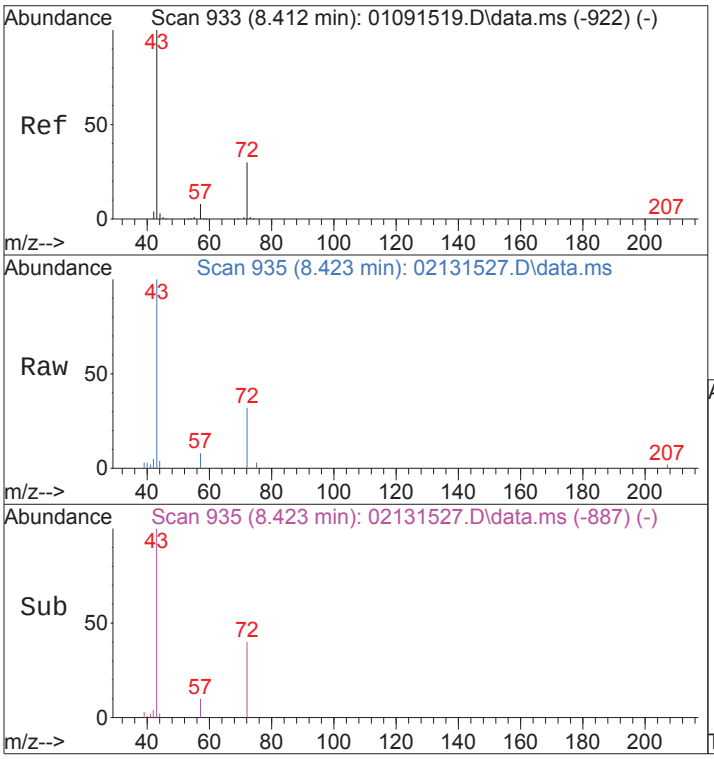


#26
Vinyl Acetate
Concen: 0.66 ng
RT: 8.14 min Scan# 882
Delta R.T. -0.043 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 86 Resp: 2123

Ion	Ratio	Lower	Upper
86	100		
43	647.3	927.5	967.5#

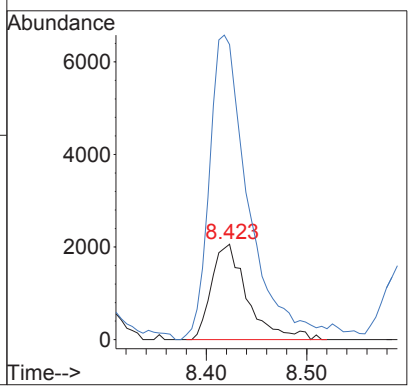


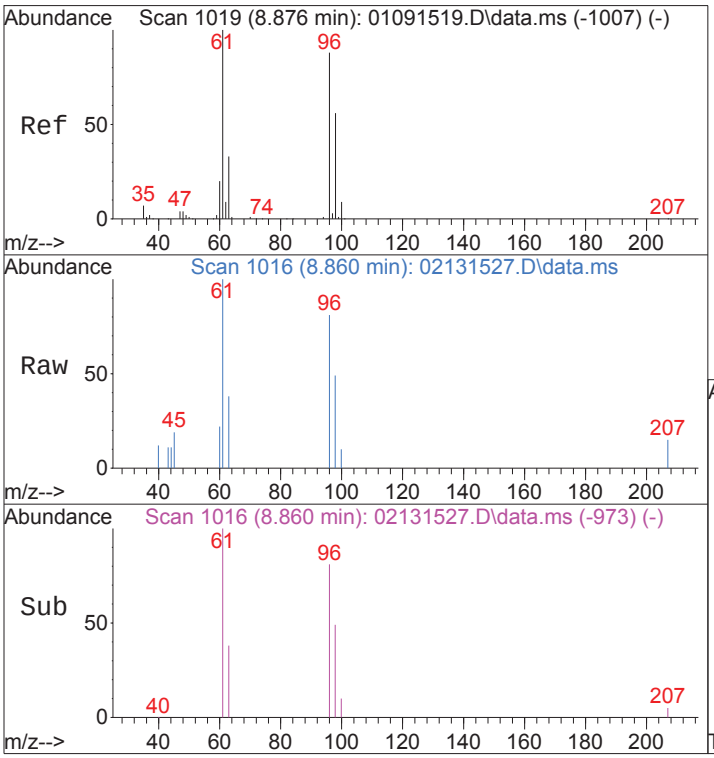


#27
2-Butanone (MEK)
Concen: 0.57 ng
RT: 8.42 min Scan# 935
Delta R.T. 0.011 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 72 Resp: 5138

Ion	Ratio	Lower	Upper
72	100		
43	355.0	315.1	355.1

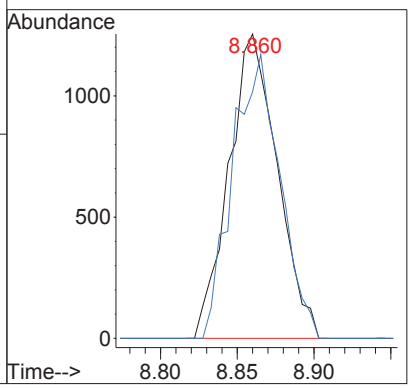


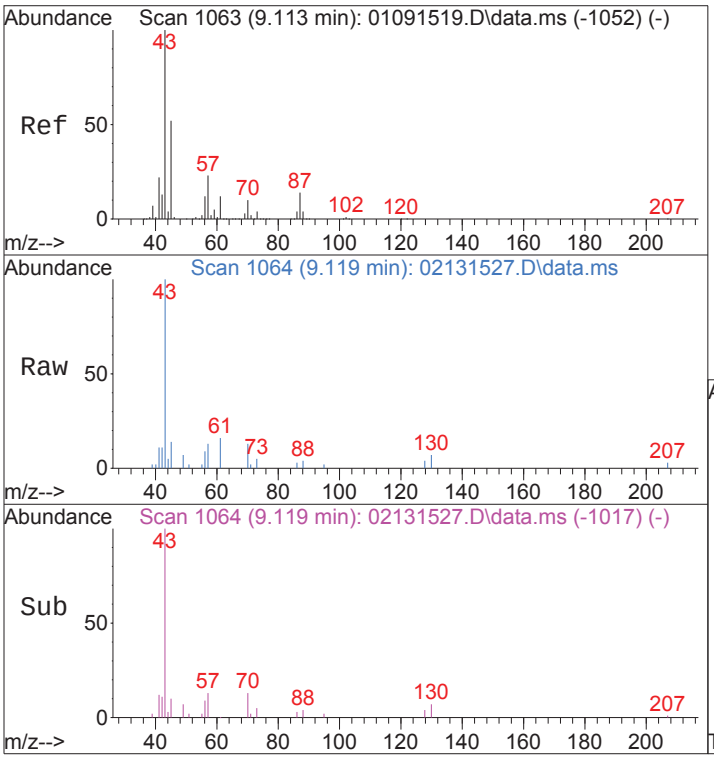


#28
cis-1,2-Dichloroethene
Concen: 0.14 ng
RT: 8.86 min Scan# 1016
Delta R.T. -0.016 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 61 Resp: 2755

Ion	Ratio	Lower	Upper
61	100		
96	91.7	68.3	108.3

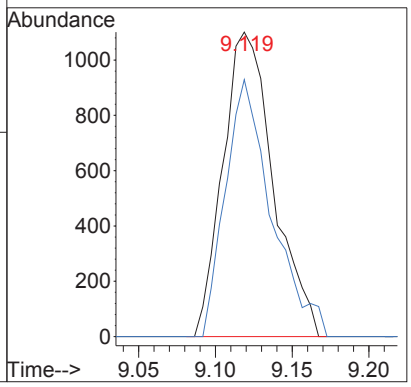


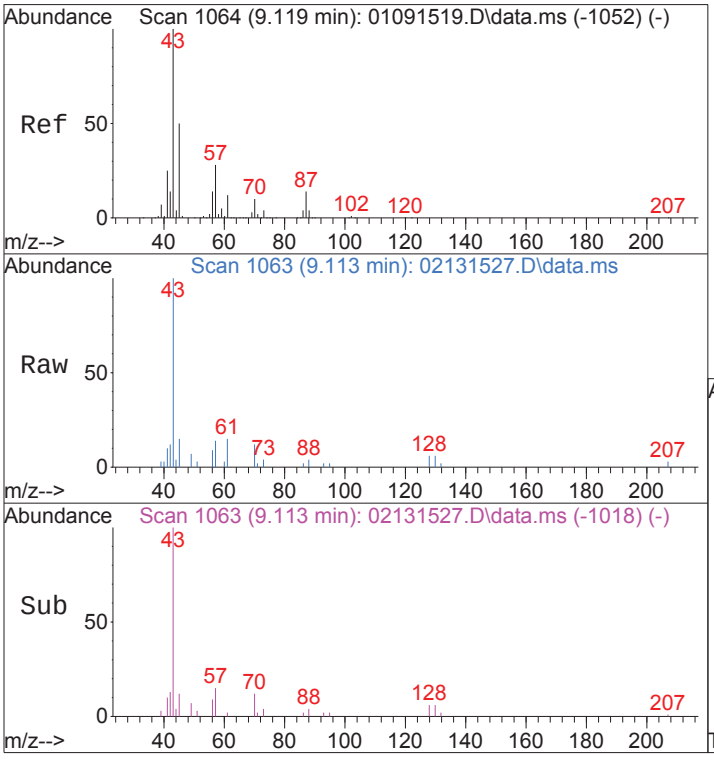


#30
Ethyl Acetate
Concen: 0.52 ng
RT: 9.12 min Scan# 1064
Delta R.T. 0.005 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 61 Resp: 2520

Ion	Ratio	Lower	Upper
61	100		
70	77.1	64.3	104.3

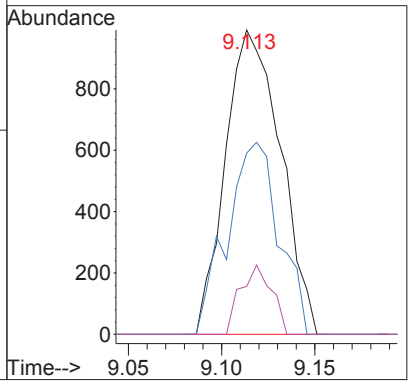


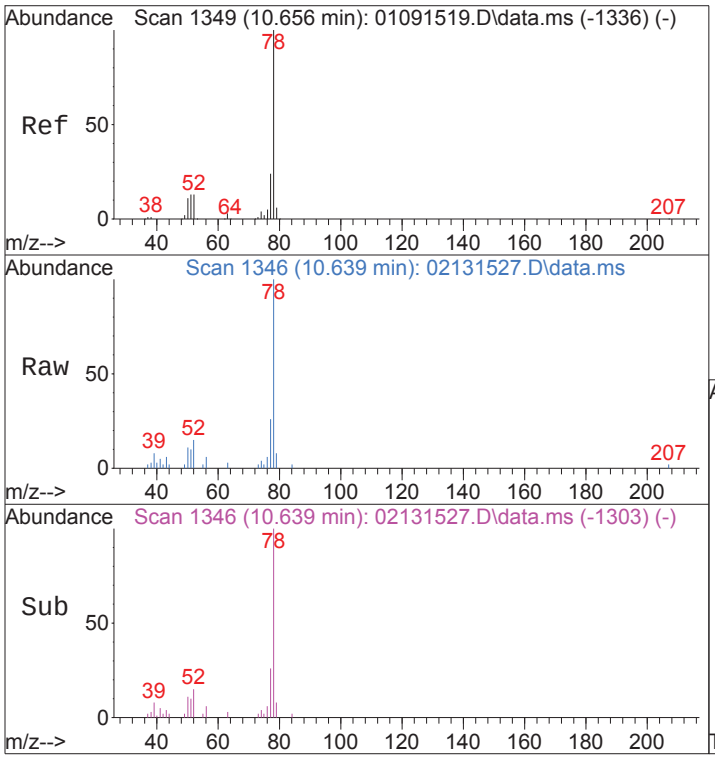


#31
n-Hexane
Concen: 0.09 ng
RT: 9.11 min Scan# 1063
Delta R.T. -0.005 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 57 Resp: 2037

Ion	Ratio	Lower	Upper
57	100		
56	59.6	40.9	61.3
86	13.0	13.0	19.4

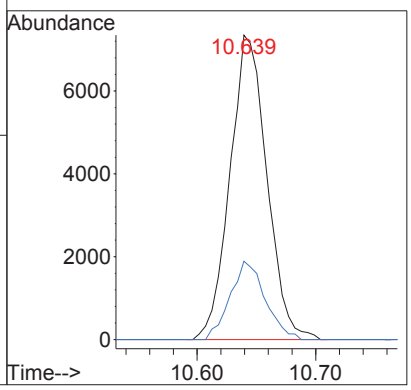


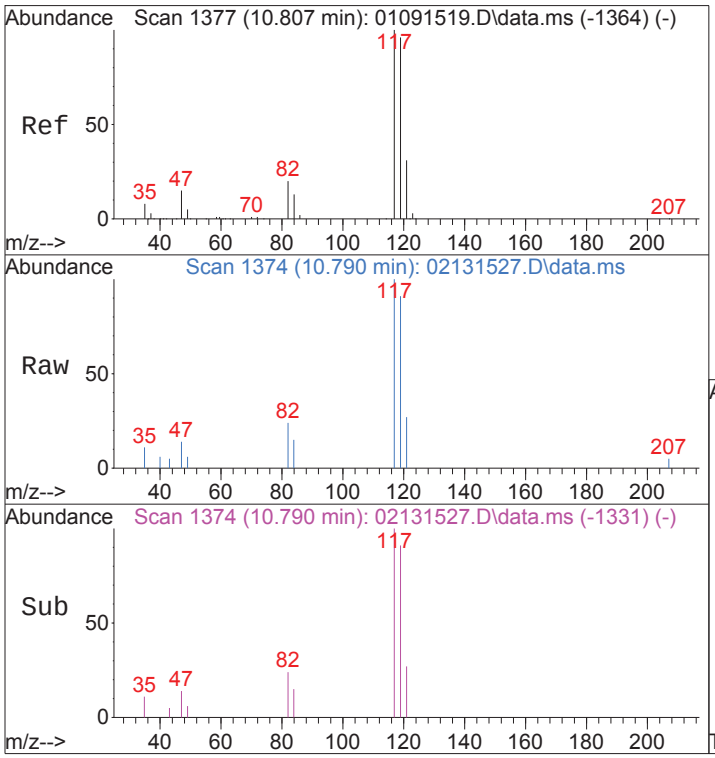


#41
Benzene
Concen: 0.25 ng
RT: 10.64 min Scan# 1346
Delta R.T. -0.016 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 78 Resp: 15900

Ion	Ratio	Lower	Upper
78	100		
77	24.4	3.6	43.6

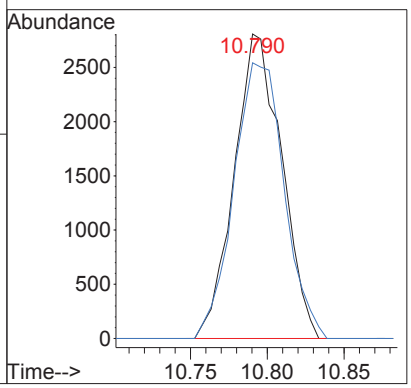


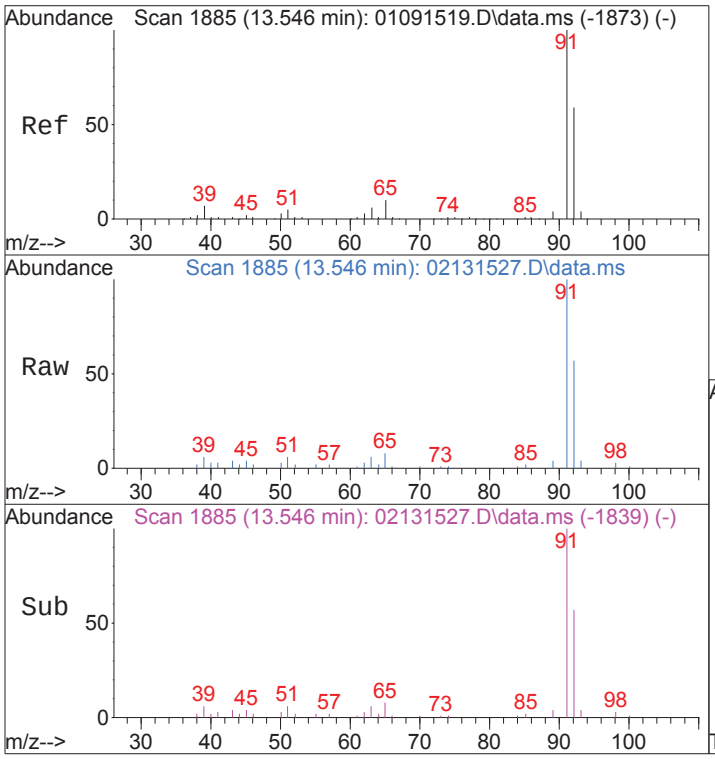


#42
Carbon Tetrachloride
Concen: 0.32 ng
RT: 10.79 min Scan# 1374
Delta R.T. -0.016 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion:117 Resp: 6020

Ion	Ratio	Lower	Upper
117	100		
119	96.4	76.6	116.6

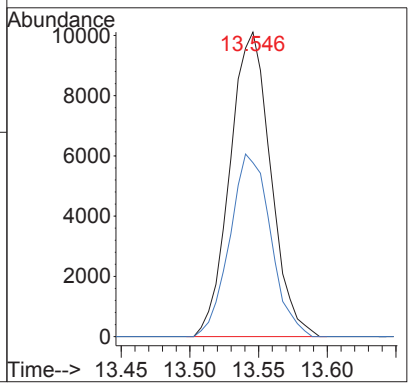


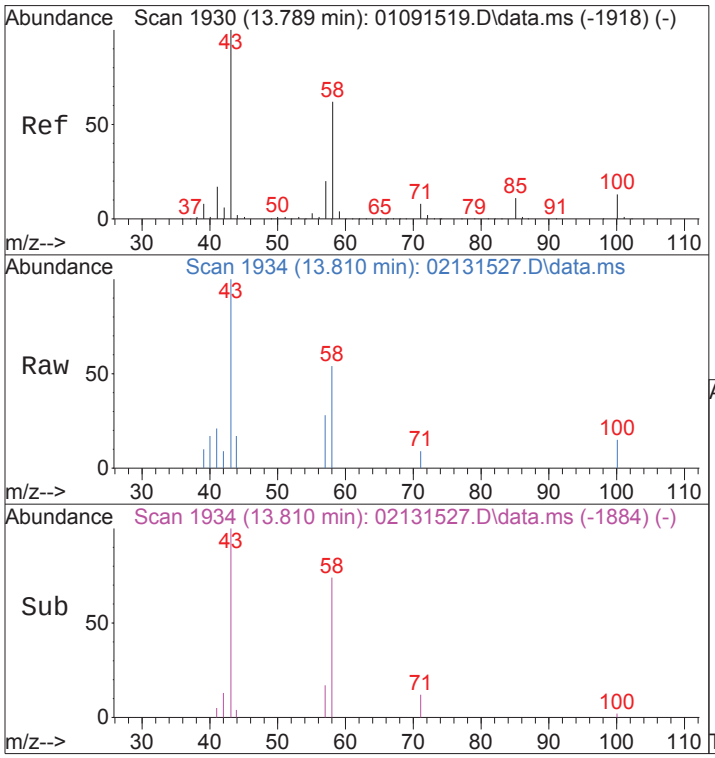


#58
Toluene
Concen: 0.31 ng
RT: 13.55 min Scan# 1885
Delta R.T. 0.000 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 91 Resp: 20883

Ion	Ratio	Lower	Upper
91	100		
92	60.0	39.0	79.0

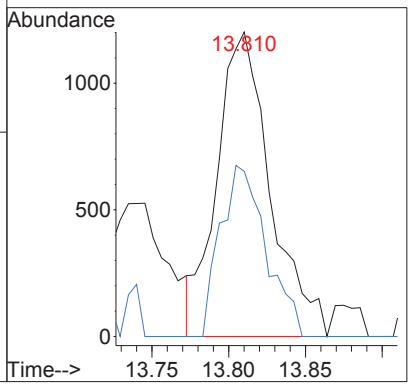


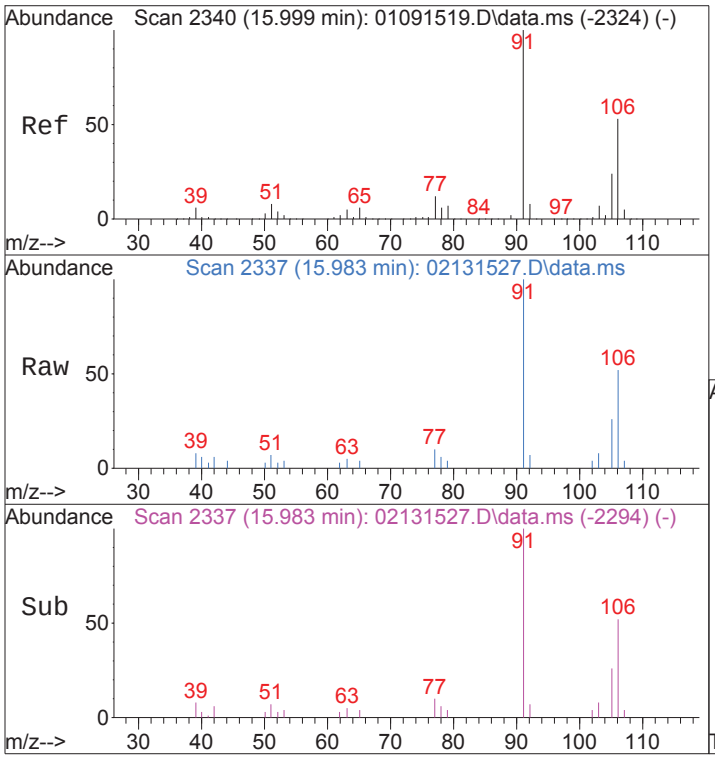


#59
2-Hexanone
Concen: 0.11 ng
RT: 13.81 min Scan# 1934
Delta R.T. 0.022 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 43 Resp: 2919

Ion	Ratio	Lower	Upper
43	100		
58	47.9	42.9	82.9

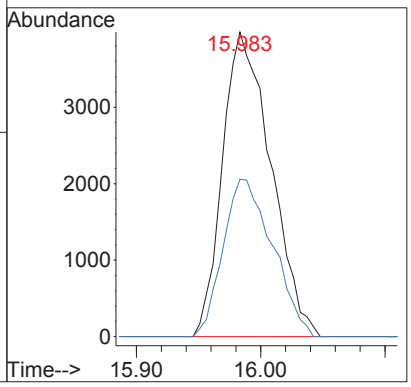


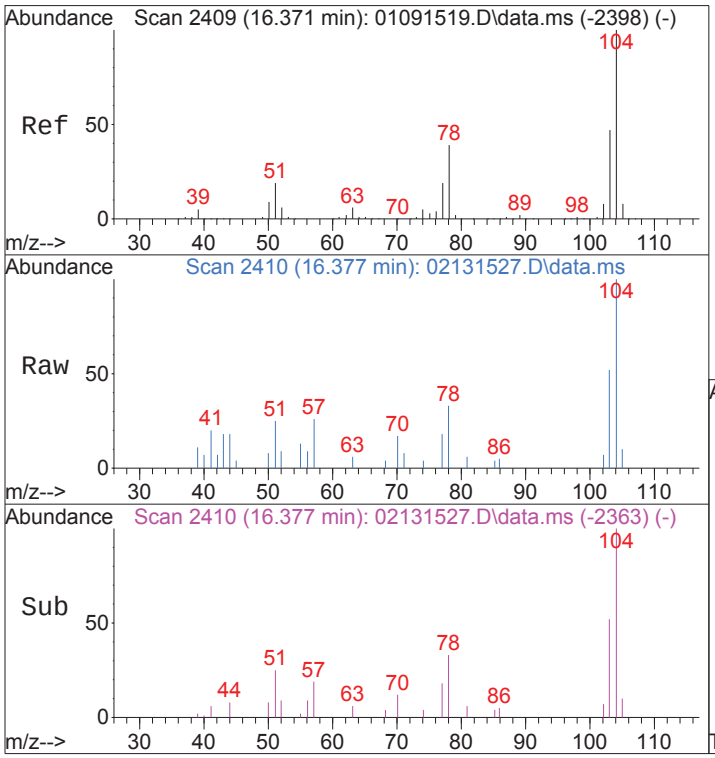


#67
m- p- ylenes
Concen: 0.18 ng
RT: 15.98 min Scan# 2337
Delta R.T. -0.016 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion: 91 Resp: 10752

Ion	Ratio	Lower	Upper
91	100		
106	52.9	31.8	71.8

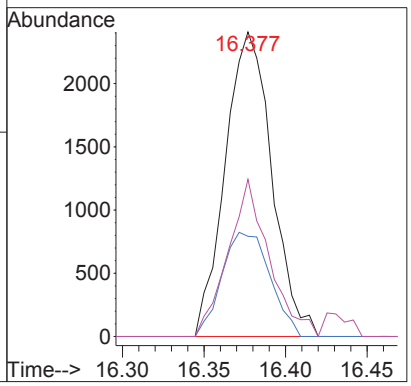


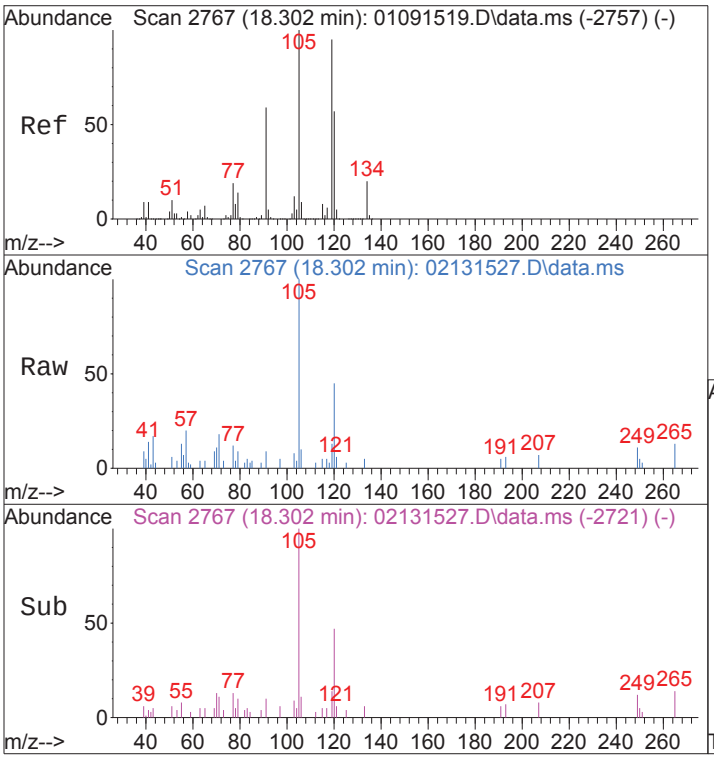


#69
Styrene
Concen: 0.10 ng
RT: 16.38 min Scan# 2410
Delta R.T. 0.005 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion:104 Resp: 4794

Ion	Ratio	Lower	Upper
104	100		
78	35.3	17.9	57.9
103	45.4	27.3	67.3

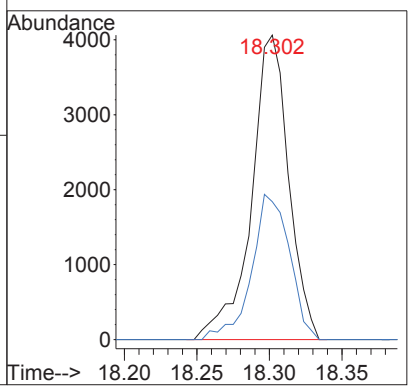




#82
1,2,4-Trimethylbenzene
Concen: 0.11 ng
RT: 18.30 min Scan# 2767
Delta R.T. 0.000 min
Lab File: 02131527.D
Acq: 13 Feb 2015 21:07

Tgt Ion:105 Resp: 7272

Ion	Ratio	Lower	Upper
105	100		
120	48.3	37.1	77.1



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131527.D
Acq On : 13 Feb 2015 21:07 Operator: SC
Sample : P1500369-003 (1000ml)
Misc : S29-01081512
ALS Vial : 7 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:24:00 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

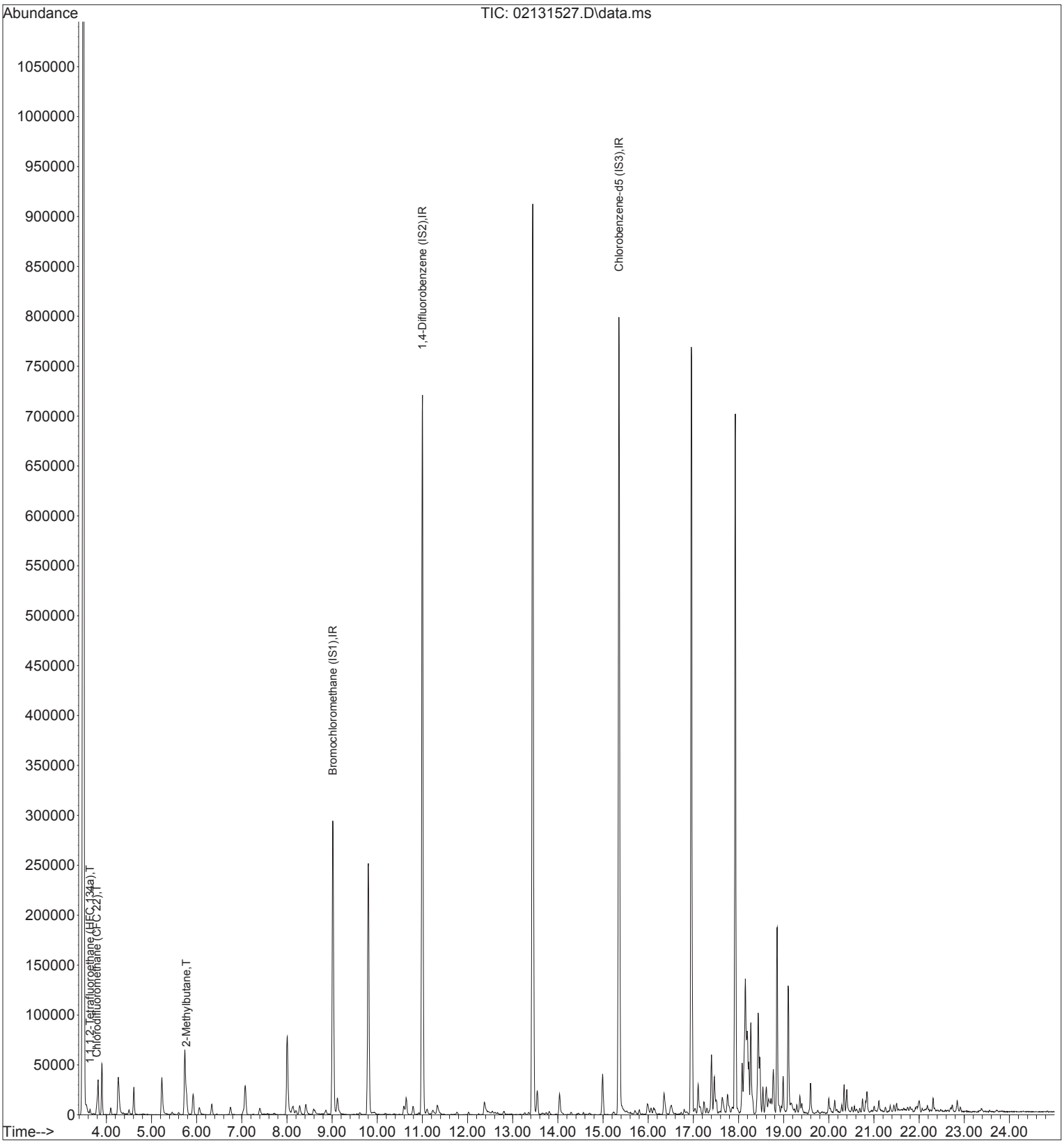
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	149104	12.500	ng		-0.02
16) 1,4-Difluorobenzene (IS2)	11.00	114	760839	12.500	ng		0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	294821	12.500	ng		0.00
Target Compounds							Qvalue
2) Chloropentafluoroethane	3.58	85	486	N.D.			
3) 1,1,1,2-Tetrafluoroeth...	3.64	83	1852	0.167	ng	#	61
4) 1,1-Difluoroethane	3.73	65	246	N.D.			
5) Chlorodifluoromethane ...	3.79	67	1309	0.402	ng		68
6) 1-Chloro-1,1-Difluoroe...	4.10	65	1467	N.D.			
7) Dichlorofluoromethane ...	0.00	67	0	N.D.			
8) Vinylbromide	0.00	108	0	N.D.			
9) 2,2-Dichloro-1,1,1-tri...	5.73	83	101	N.D.			
10) 2-Methylbutane	5.78	57	6400	0.534	ng	#	67
11) Methyl Acetate	6.76	43	1459	N.D.			
12) 2-Methylpentane	8.20	71	1101	N.D.			
13) 2,2-Dichloropropane	0.00	77	0	N.D.			
14) 1,1-Dichloropropene	0.00	75	0	N.D.			
15) Thiophene	10.80	84	755	N.D.			
17) 2,3-Dimethylpentane	11.18	56	309	N.D.			
18) Dibromomethane	0.00	174	0	N.D.			
20) Methyl Cyclohexane	12.67	55	540	N.D.			
21) 1,3-Dichloropropane	0.00	76	0	N.D.	d		
22) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.			
23) 1-Chlorohexane	0.00	91	0	N.D.			
24) 1,2,3-Trichloropropane	16.53	75	231	N.D.			
25) Bromobenzene	0.00	77	0	N.D.			
26) 2-Chlorotoluene	17.64	91	2241	N.D.			
27) 4-Chlorotoluene	17.64	91	2241	N.D.			
28) Indan	18.95	117	847	N.D.			
29) Indene	19.05	115	38	N.D.			
30) 1,2,4,5-Tetramethylben...	20.00	119	1110	N.D.			
31) 1,2,3,4-Tetramethylben...	20.04	119	1422	N.D.			
32) 1,2,3,5-Tetramethylben...	20.43	119	1505	N.D.			
33) 1,2,3-Trichlorobenzene	0.00	180	0	N.D.			

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131527.D
Acq On : 13 Feb 2015 21:07 Operator: SC
Sample : P1500369-003 (1000ml)
Misc : S29-01081512
ALS Vial : 7 Sample Multiplier: 1

Quant Time: Feb 16 10:24:00 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131528.D
Acq On : 13 Feb 2015 21:41 Operator: SC
Sample : P1500369-004 (1000ml)
Misc : S29-01081512
ALS Vial : 8 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:20:37 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	146211	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.00	114	764809	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	293613	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	187154	11.609	ng		-0.02
Spiked Amount 12.500			Recovery = 92.88%				
57) Toluene-d8 (SS2)	13.44	98	730773	12.081	ng		0.00
Spiked Amount 12.500			Recovery = 96.64%				
73) Bromofluorobenzene (SS3)	16.96	174	304427	13.426	ng		0.00
Spiked Amount 12.500			Recovery = 107.44%				
Target Compounds							Qvalue
2) Propene	3.80	42	18391	1.496	ng		87
3) Dichlorodifluoromethan...	3.90	85	38673	1.356	ng		99
4) Chloromethane	4.10	50	3436	0.188	ng		95
5) 1,2-Dichloro-1,1,2,2-t...	4.25	135	1045	N.D.			
6) Vinyl Chloride	4.38	62	399	N.D.			
7) 1,3-Butadiene	4.50	54	33	N.D.			
8) Bromomethane	4.85	94	269	N.D.			
9) Chloroethane	5.06	64	75	N.D.			
10) Ethanol	5.23	45	62127	6.729	ng		99
11) Acetonitrile	5.45	41	4271	0.196	ng		82
12) Acrolein	5.59	56	4917	0.686	ng		100
13) Acetone	5.73	58	104778	10.784	ng		98
14) Trichlorofluoromethane	5.92	101	17688	0.770	ng		100
15) 2-Propanol (Isopropanol)	6.03	45	161303	5.322	ng		99
16) Acrylonitrile	6.33	53	75	N.D.			
17) 1,1-Dichloroethene	6.62	96	32	N.D.			
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D. d			
19) Methylene Chloride	6.75	84	3896	0.252	ng		99
20) 3-Chloro-1-propene (Al...	6.81	41	46	N.D.			
21) Trichlorotrifluoroethane	7.08	151	25644	1.947	ng		99
22) Carbon Disulfide	7.04	76	5246	0.107	ng		74
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	8.01	73	926	N.D.			
26) Vinyl Acetate	8.14	86	4239	1.344	ng	#	10
27) 2-Butanone (MEK)	8.41	72	12166	1.374	ng		93
28) cis-1,2-Dichloroethene	8.87	61	720	N.D.			
29) Diisopropyl Ether	9.10	87	455	N.D.			
30) Ethyl Acetate	9.10	61	31833	6.637	ng		92
31) n-Hexane	9.12	57	2217	0.100	ng		92
32) Chloroform	9.16	83	1282	N.D.			
34) Tetrahydrofuran (THF)	9.60	72	1328	0.143	ng	#	35
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	9.92	62	709	N.D.			
38) 1,1,1-Trichloroethane	10.19	97	433	N.D.			
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	10.64	78	15466	0.242	ng		99
42) Carbon Tetrachloride	10.80	117	5168	0.271	ng		97
43) Cyclohexane	10.93	84	330	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	11.46	63	42	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.			
47) Trichloroethene	11.70	130	2636	0.144	ng		95
48) 1,4-Dioxane	11.70	88	4681	0.385	ng		96
49) 2,2,4-Trimethylpentane...	11.77	57	1761	N.D.			

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131528.D
Acq On : 13 Feb 2015 21:41 Operator: SC
Sample : P1500369-004 (1000ml)
Misc : S29-01081512
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Feb 16 10:20:37 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

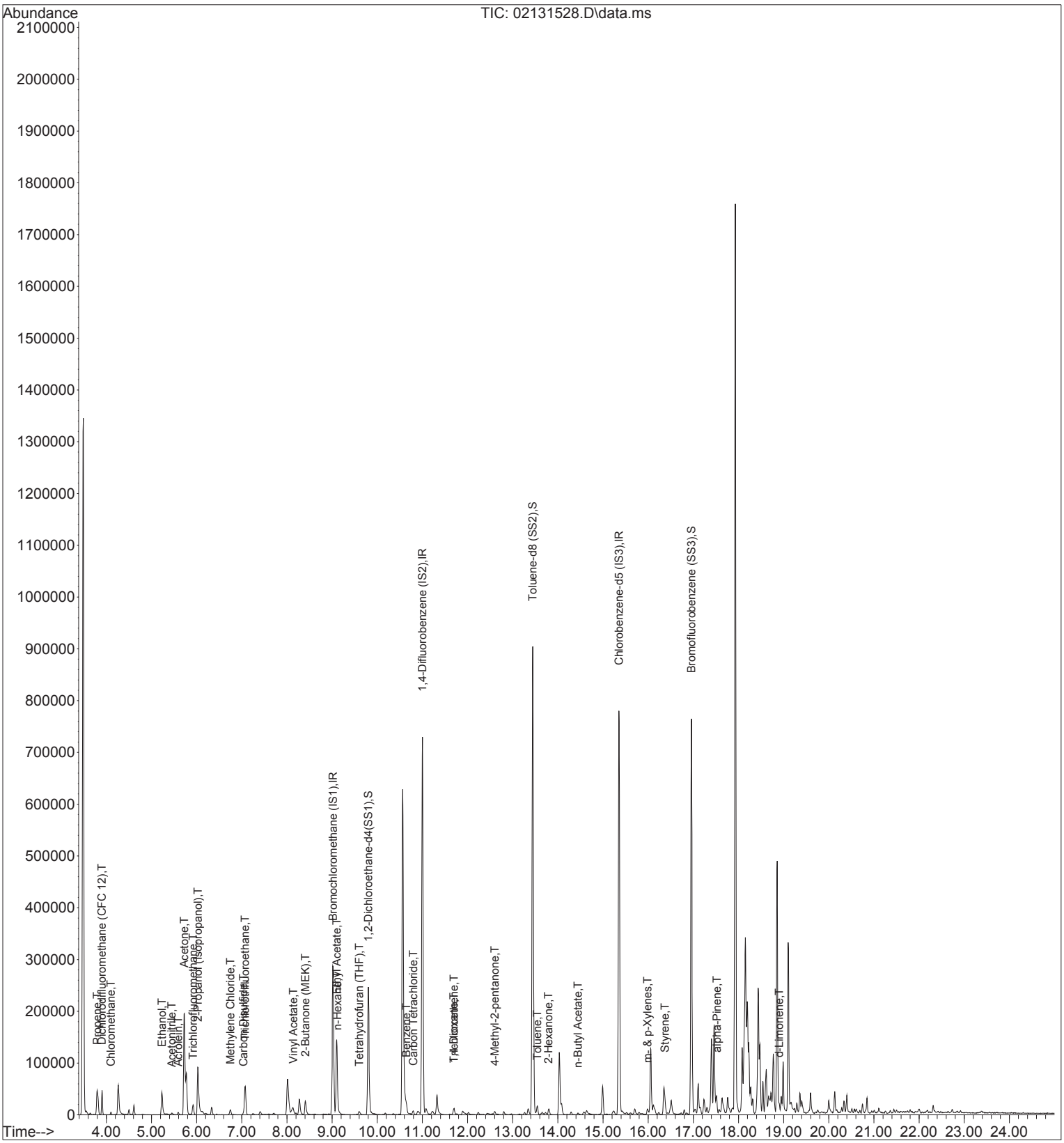
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
50) Methyl Methacrylate	12.01	100	94	N.D.		
51) n-Heptane	12.03	71	813	N.D.		
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	12.60	58	1972	0.167 ng	#	62
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	13.25	97	42	N.D.		
58) Toluene	13.55	91	15324	0.225 ng		100
59) 2-Hexanone	13.79	43	9016	0.329 ng		100
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	14.44	43	3670	0.126 ng		85
63) n-Octane	14.57	57	620	N.D.		
64) Tetrachloroethene	14.70	166	313	N.D.		
65) Chlorobenzene	15.40	112	260	N.D.		
66) Ethylbenzene	15.81	91	3498	N.D.		
67) m- p- ylenes	15.98	91	8277	0.137 ng		95
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	16.37	104	13876	0.292 ng		99
70) o- ylene	16.49	91	4239	N.D.		
71) n-Nonane	16.73	43	1023	N.D.		
72) 1,1,2,2-Tetrachloroethane	16.51	83	576	N.D.		
74) Cumene	17.11	105	892	N.D.		
75) alpha-Pinene	17.52	93	8593	0.218 ng	#	1
76) n-Propylbenzene	17.63	91	2365	N.D.		
77) 3-Ethyltoluene	17.75	105	2452	N.D.		
78) 4-Ethyltoluene	17.80	105	1263	N.D.		
79) 1,3,5-Trimethylbenzene	17.87	105	958	N.D.		
80) alpha-Methylstyrene	18.03	118	951	N.D.		
81) 2-Ethyltoluene	18.08	105	944	N.D.		
82) 1,2,4-Trimethylbenzene	18.30	105	3742	N.D.		
83) n-Decane	0.00	57	0	N.D. d		
84) Benzyl Chloride	18.44	91	491	N.D.		
85) 1,3-Dichlorobenzene	18.52	146	380	N.D.		
86) 1,4-Dichlorobenzene	18.52	146	380	N.D.		
87) sec-Butylbenzene	18.60	105	1150	N.D.		
88) 4-Isopropyltoluene (p-...	18.75	119	6644	N.D.		
89) 1,2,3-Trimethylbenzene	18.75	105	1439	N.D.		
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	18.90	68	3013	0.132 ng		100
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	19.75	57	2452	N.D.		
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.		
95) Naphthalene	20.81	128	4058	N.D.		
96) n-Dodecane	0.00	57	0	N.D. d		
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	0.00	55	0	N.D. d		
99) tert-Butylbenzene	18.27	119	1211	N.D.		
100) n-Butylbenzene	19.18	91	4954	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131528.D
Acq On : 13 Feb 2015 21:41 Operator: SC
Sample : P1500369-004 (1000ml)
Misc : S29-01081512
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Feb 16 10:20:37 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131528.D
Acq On : 13 Feb 2015 21:41 Operator: SC
Sample : P1500369-004 (1000ml)
Misc : S29-01081512
ALS Vial : 8 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:20:37 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

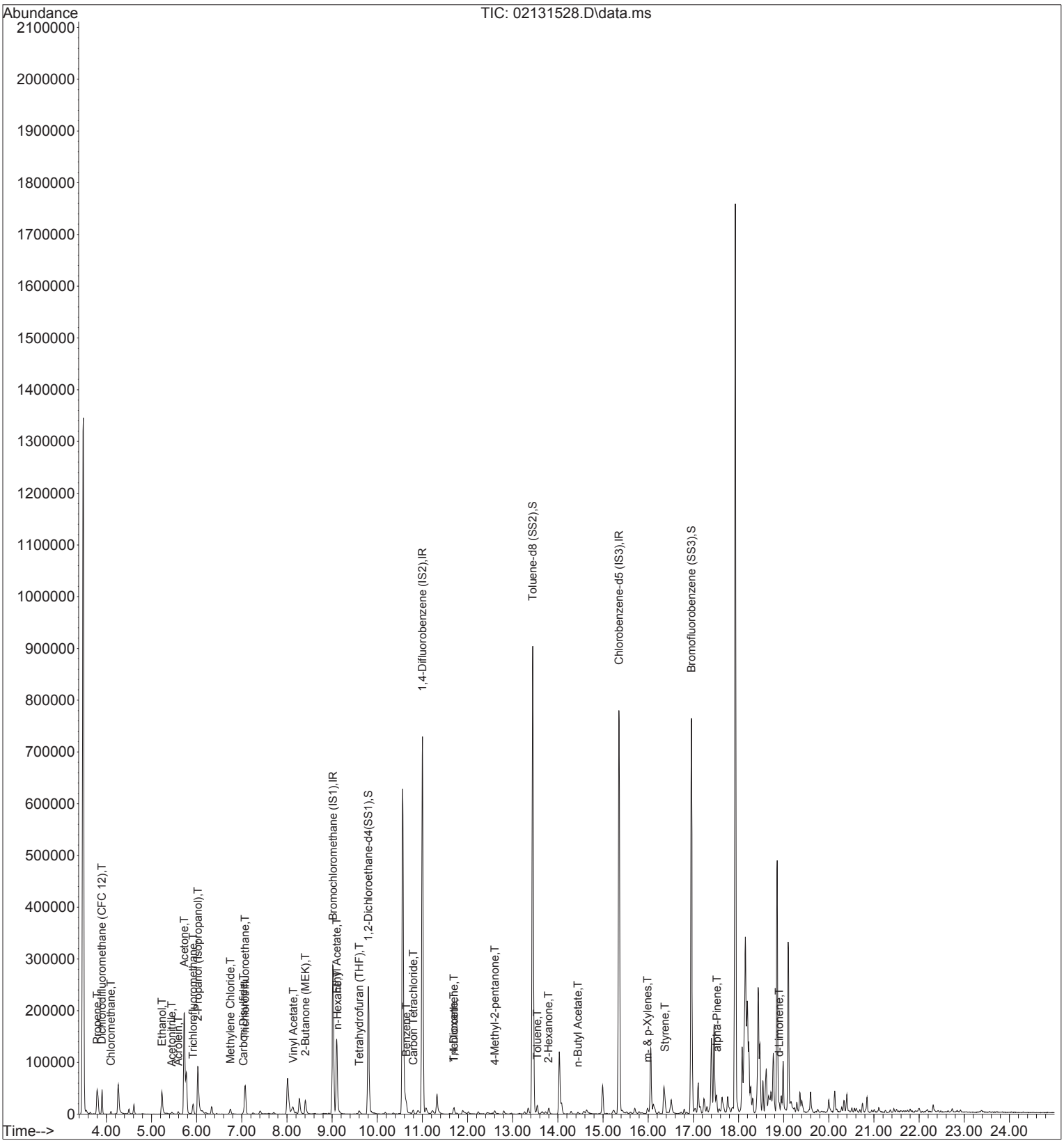
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	146211	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.00	114	764809	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	293613	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	187154	11.609	ng		-0.02
Spiked Amount 12.500			Recovery = 92.88%				
57) Toluene-d8 (SS2)	13.44	98	730773	12.081	ng		0.00
Spiked Amount 12.500			Recovery = 96.64%				
73) Bromofluorobenzene (SS3)	16.96	174	304427	13.426	ng		0.00
Spiked Amount 12.500			Recovery = 107.44%				
Target Compounds							Qvalue
2) Propene	3.80	42	18391	1.496	ng		87
3) Dichlorodifluoromethan...	3.90	85	38673	1.356	ng		99
4) Chloromethane	4.10	50	3436	0.188	ng		95
10) Ethanol	5.23	45	62127	6.729	ng		99
11) Acetonitrile	5.45	41	4271	0.196	ng		82
12) Acrolein	5.59	56	4917	0.686	ng		100
13) Acetone	5.73	58	104778	10.784	ng		98
14) Trichlorofluoromethane	5.92	101	17688	0.770	ng		100
15) 2-Propanol (Isopropanol)	6.03	45	161303	5.322	ng		99
19) Methylene Chloride	6.75	84	3896	0.252	ng		99
21) Trichlorotrifluoroethane	7.08	151	25644	1.947	ng		99
22) Carbon Disulfide	7.04	76	5246	0.107	ng		74
26) Vinyl Acetate	8.14	86	4239	1.344	ng	#	10
27) 2-Butanone (MEK)	8.41	72	12166	1.374	ng		93
30) Ethyl Acetate	9.10	61	31833	6.637	ng		92
31) n-Hexane	9.12	57	2217	0.100	ng		92
34) Tetrahydrofuran (THF)	9.60	72	1328	0.143	ng	#	35
41) Benzene	10.64	78	15466	0.242	ng		99
42) Carbon Tetrachloride	10.80	117	5168	0.271	ng		97
47) Trichloroethene	11.70	130	2636	0.144	ng		95
48) 1,4-Dioxane	11.70	88	4681	0.385	ng		96
53) 4-Methyl-2-pentanone	12.60	58	1972	0.167	ng	#	62
58) Toluene	13.55	91	15324	0.225	ng		100
59) 2-Hexanone	13.79	43	9016	0.329	ng		100
62) n-Butyl Acetate	14.44	43	3670	0.126	ng		85
67) m- p- ylenes	15.98	91	8277	0.137	ng		95
69) Styrene	16.37	104	13876	0.292	ng		99
75) alpha-Pinene	17.52	93	8593	0.218	ng	#	1
91) d-Limonene	18.90	68	3013	0.132	ng		100

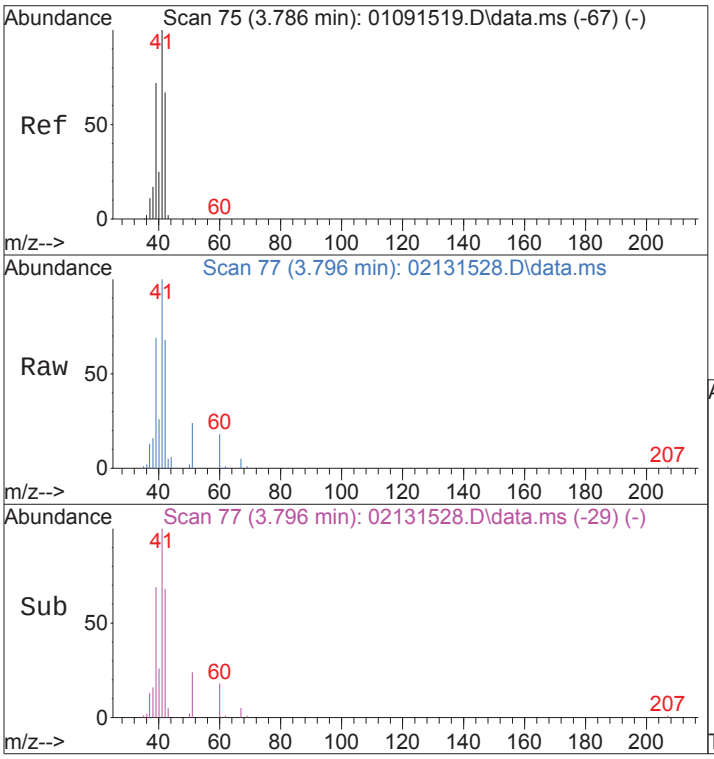
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131528.D
Acq On : 13 Feb 2015 21:41 Operator: SC
Sample : P1500369-004 (1000ml)
Misc : S29-01081512
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Feb 16 10:20:37 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

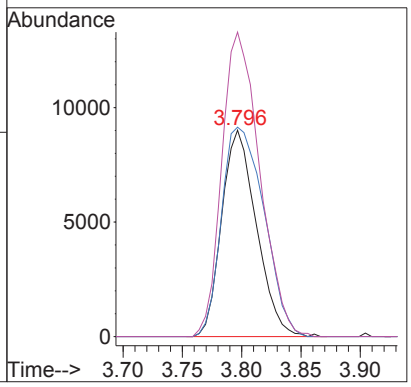


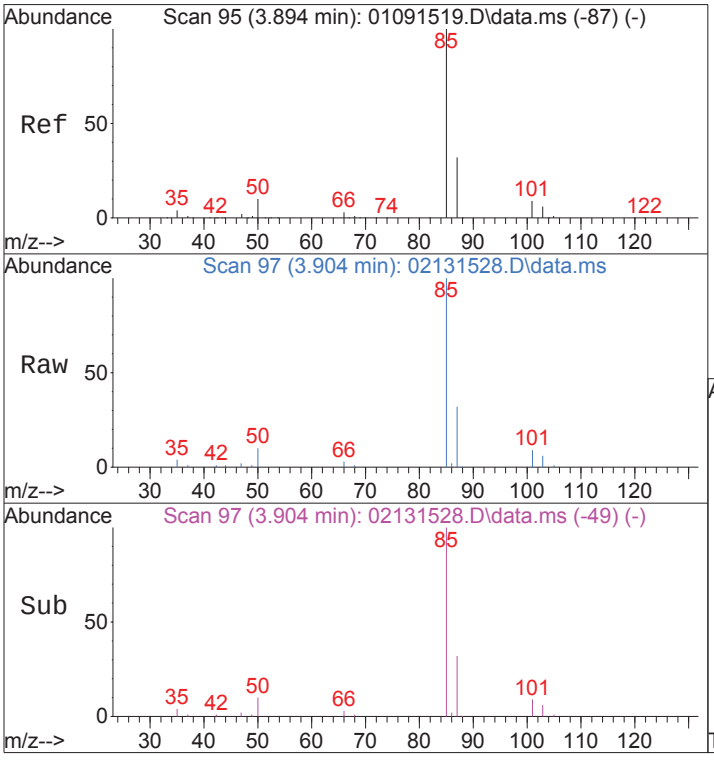


#2
Propene
Concen: 1.50 ng
RT: 3.80 min Scan# 77
Delta R.T. 0.011 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 42 Resp: 18391

Ion	Ratio	Lower	Upper
42	100		
39	123.9	86.5	126.5
41	161.4	129.2	169.2

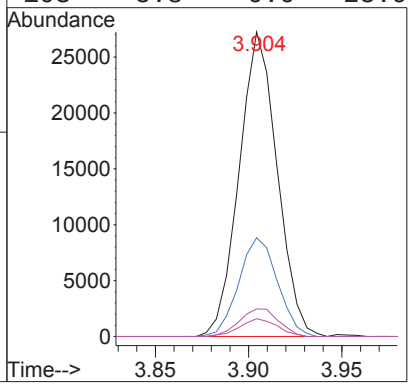


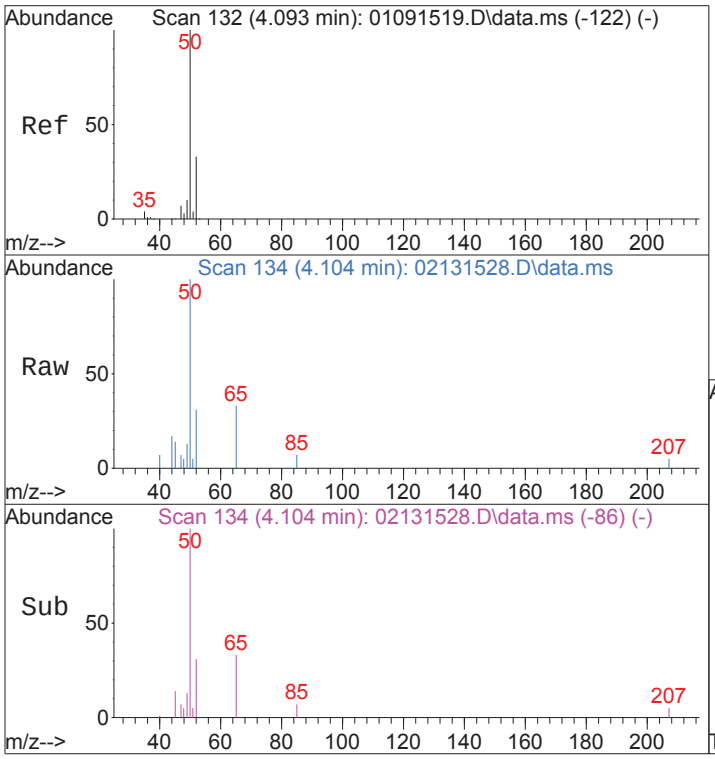


#3
Dichlorodifluoromethane (CFC 12)
Concen: 1.36 ng
RT: 3.90 min Scan# 97
Delta R.T. 0.011 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 85 Resp: 38673

Ion	Ratio	Lower	Upper
85	100		
87	33.0	12.4	52.4
101	9.4	0.0	29.0
103	5.8	0.0	25.9

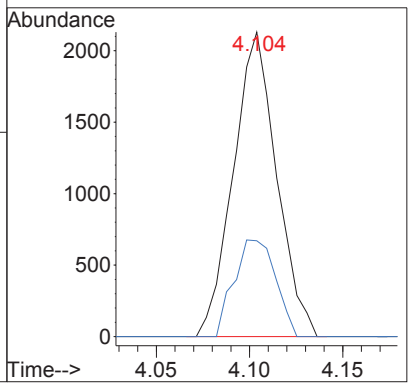


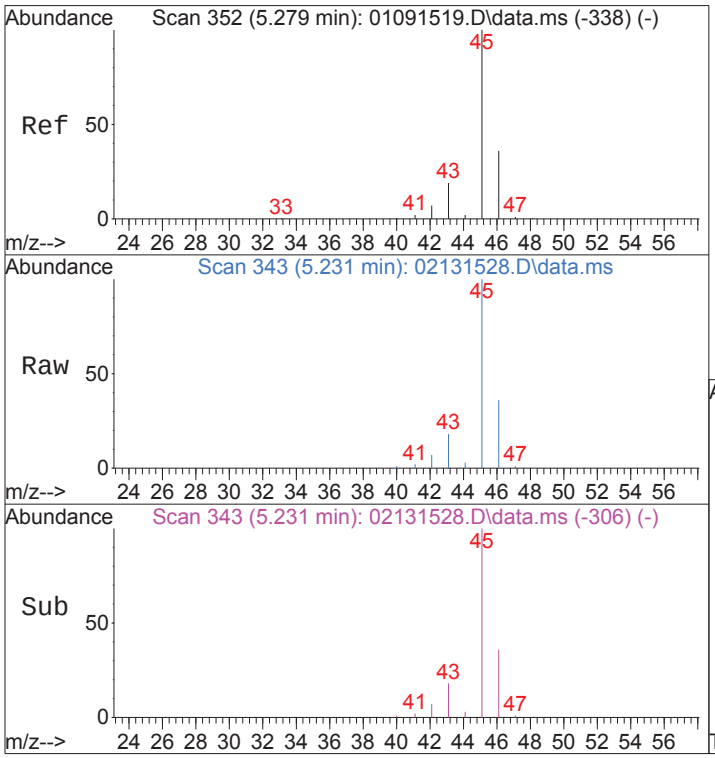


#4
Chloromethane
Concen: 0.19 ng
RT: 4.10 min Scan# 134
Delta R.T. 0.011 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 50 Resp: 3436

Ion	Ratio	Lower	Upper
50	100		
52	30.5	13.3	53.3

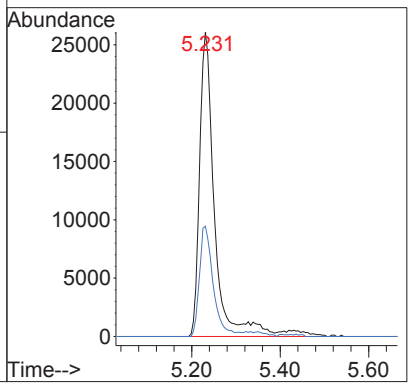


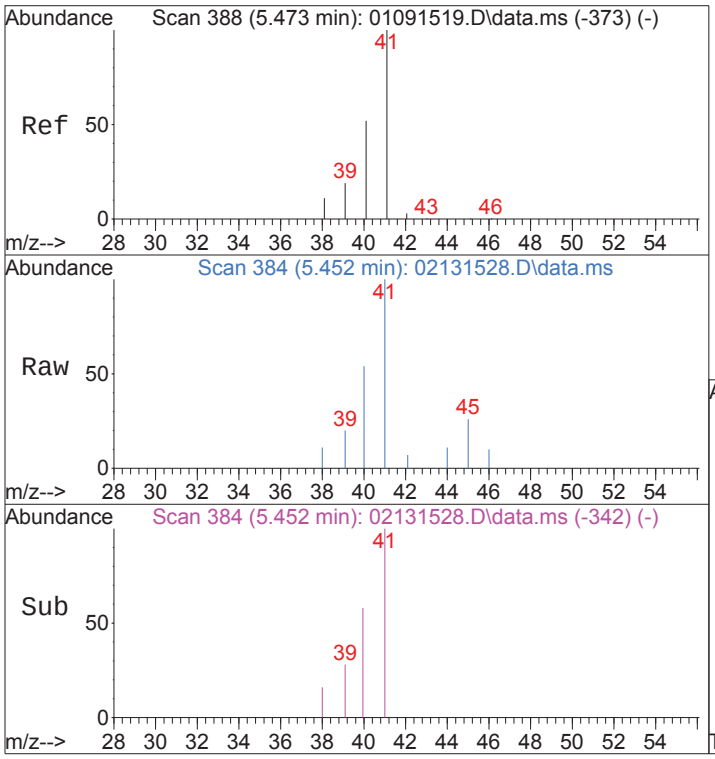


#10
Ethanol
Concen: 6.73 ng
RT: 5.23 min Scan# 343
Delta R.T. -0.049 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 45 Resp: 62127

Ion	Ratio	Lower	Upper
45	100		
46	35.0	15.6	55.6

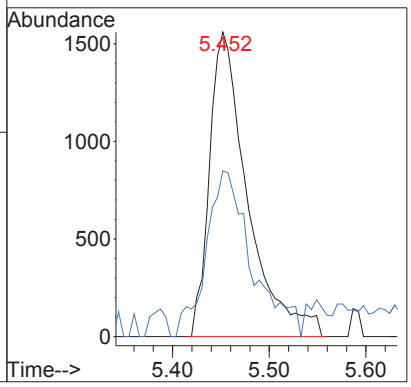


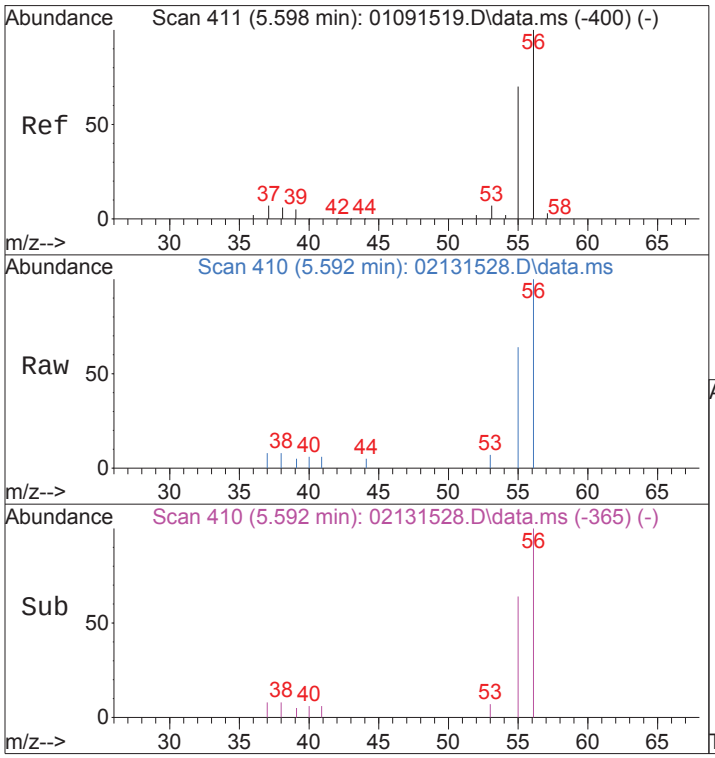


#11
Acetonitrile
Concen: 0.20 ng
RT: 5.45 min Scan# 384
Delta R.T. -0.022 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 41 Resp: 4271

Ion	Ratio	Lower	Upper
41	100		
40	64.8	32.2	72.2

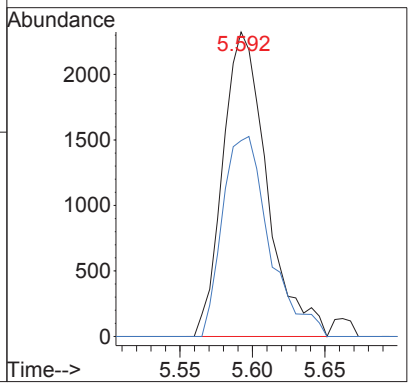


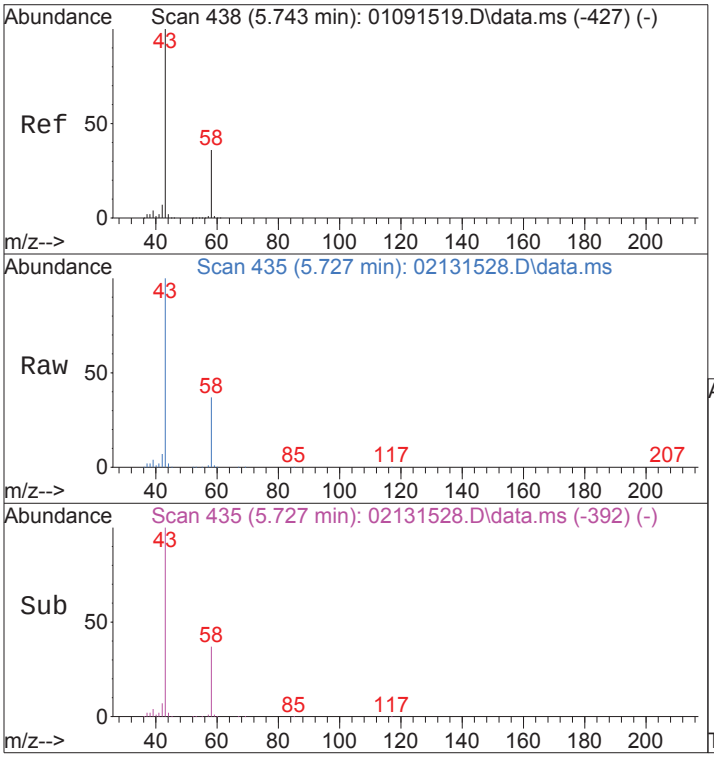


#12
Acrolein
Concen: 0.69 ng
RT: 5.59 min Scan# 410
Delta R.T. -0.005 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 56 Resp: 4917

Ion	Ratio	Lower	Upper
56	100		
55	69.6	49.7	89.7

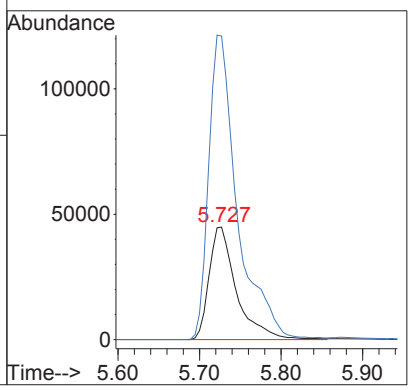


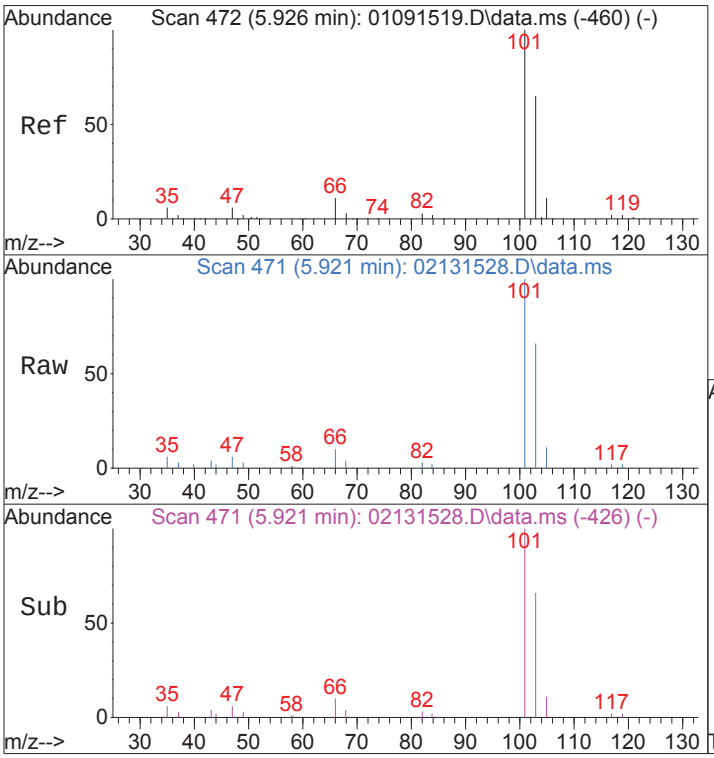


#13
Acetone
Concen: 10.78 ng
RT: 5.73 min Scan# 435
Delta R.T. -0.016 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 58 Resp: 104778

Ion	Ratio	Lower	Upper
58	100		
43	283.2	250.2	310.2

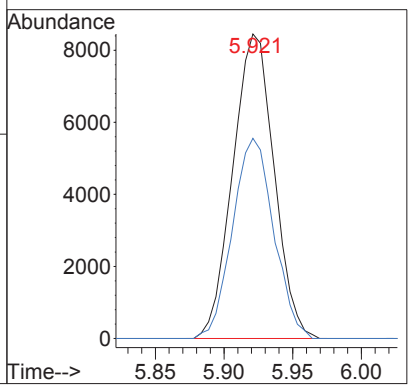


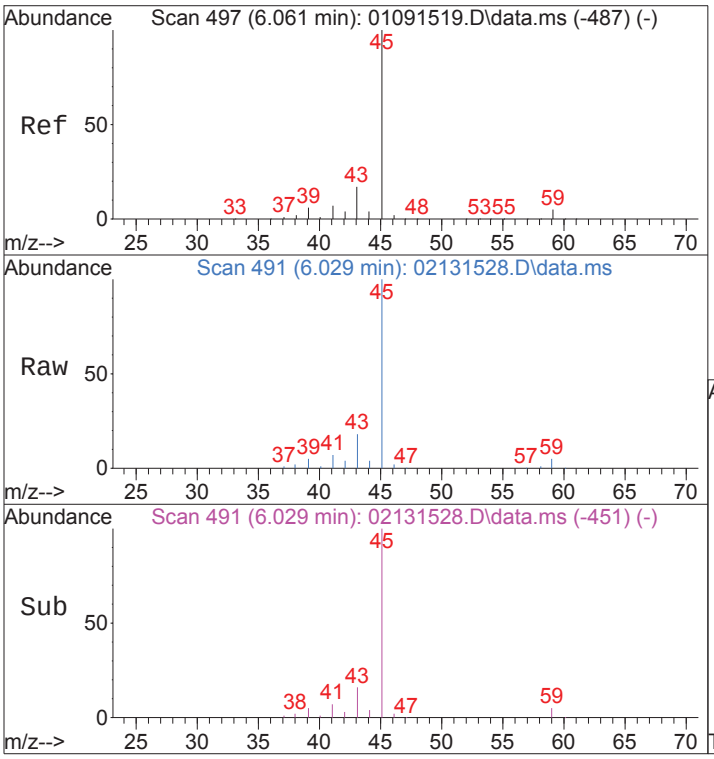


#14
Trichlorofluoromethane
Concen: 0.77 ng
RT: 5.92 min Scan# 471
Delta R.T. -0.005 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion:101 Resp: 17688

Ion	Ratio	Lower	Upper
101	100		
103	65.5	45.5	85.5

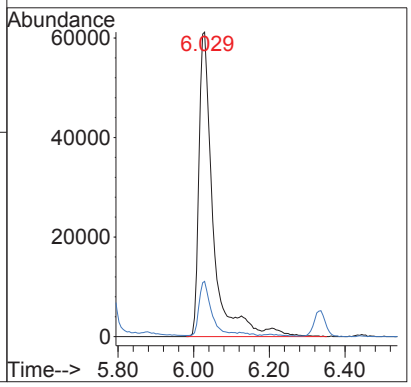


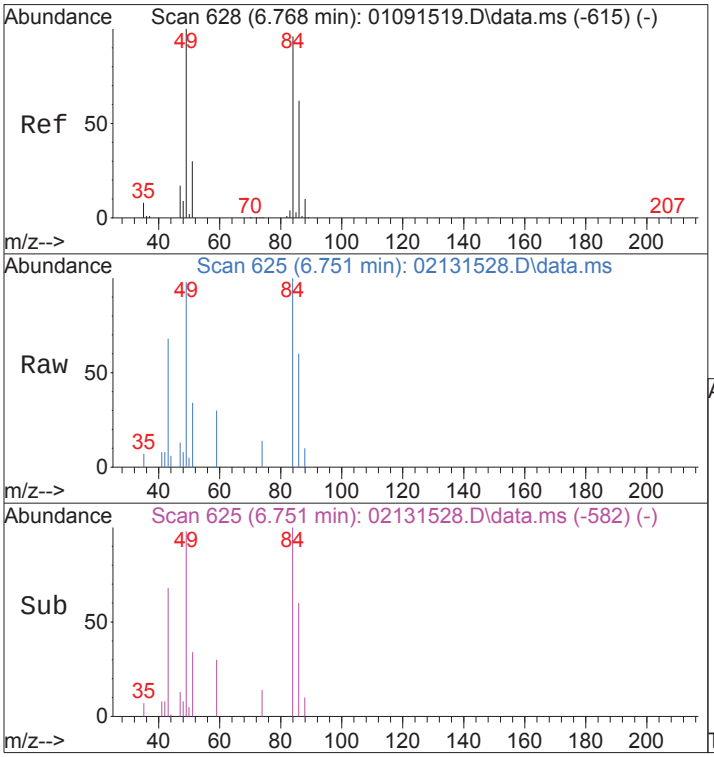


#15
2-Propanol (Isopropanol)
Concen: 5.32 ng
RT: 6.03 min Scan# 491
Delta R.T. -0.032 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 45 Resp: 161303

Ion	Ratio	Lower	Upper
45	100		
43	17.5	0.0	37.3

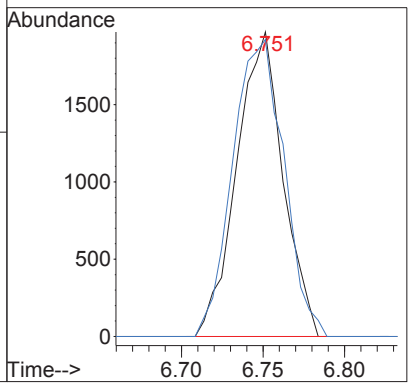


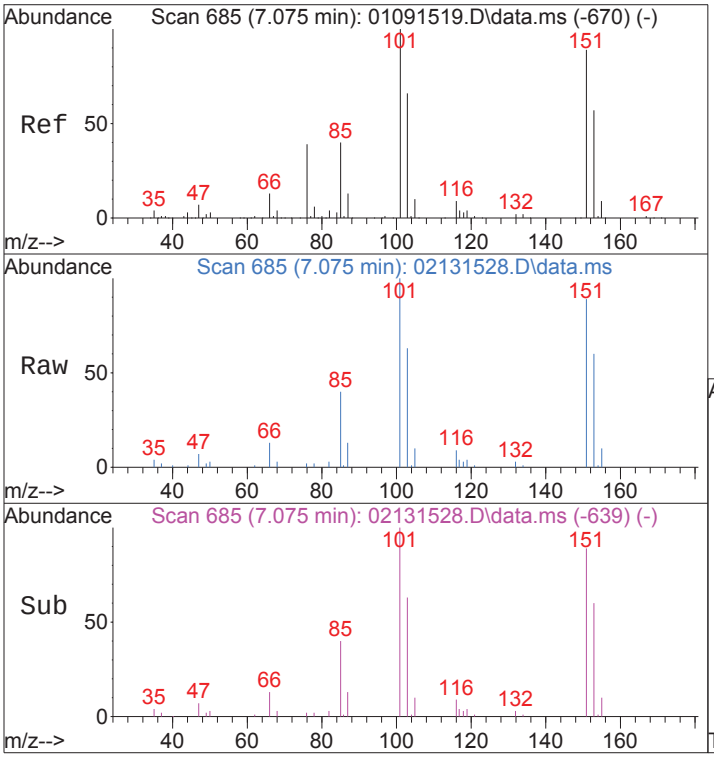


#19
Methylene Chloride
Concen: 0.25 ng
RT: 6.75 min Scan# 625
Delta R.T. -0.017 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 84 Resp: 3896

Ion	Ratio	Lower	Upper
84	100		
49	108.0	82.1	132.1

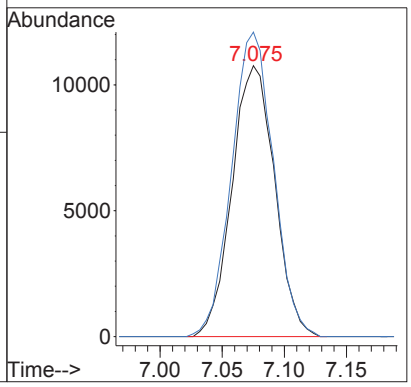


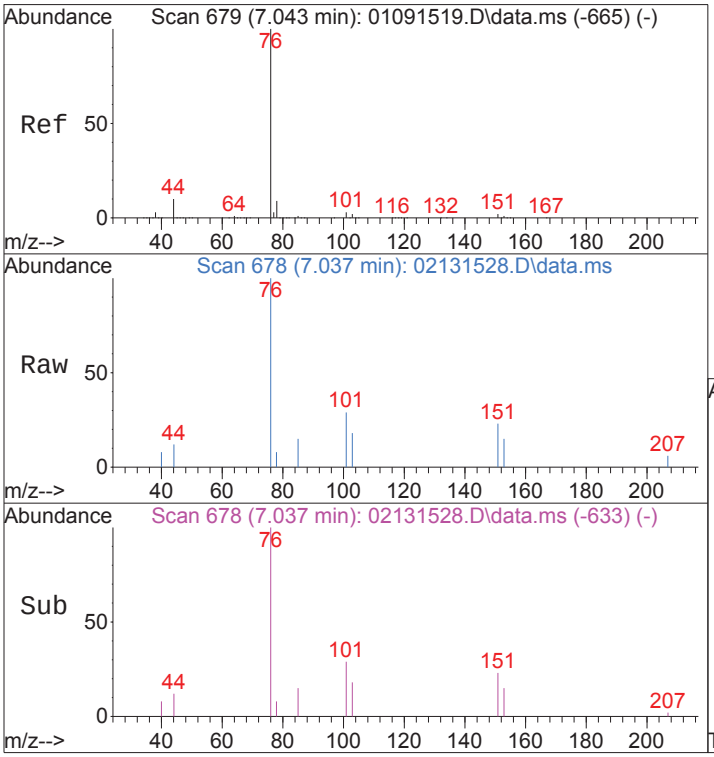


#21
Trichlorotrifluoroethane
Concen: 1.95 ng
RT: 7.08 min Scan# 685
Delta R.T. -0.000 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion:151 Resp: 25644

Ion	Ratio	Lower	Upper
151	100		
101	110.5	91.9	131.9

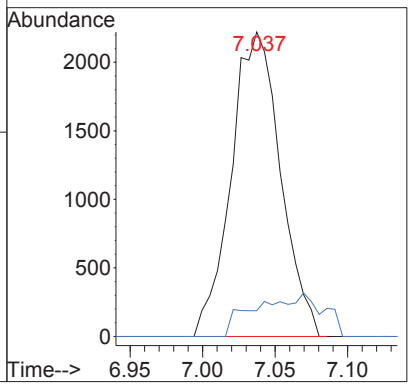


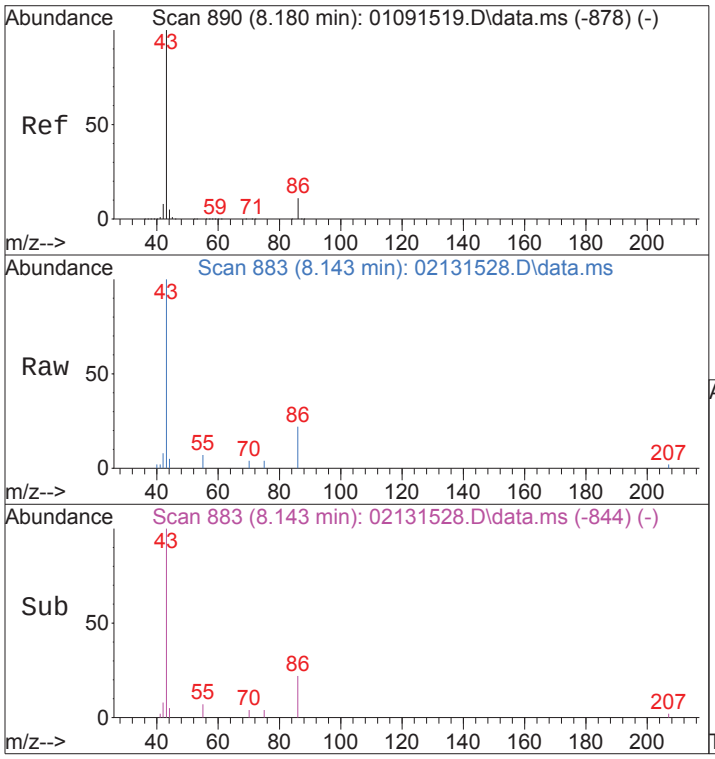


#22
Carbon Disulfide
Concen: 0.11 ng
RT: 7.04 min Scan# 678
Delta R.T. -0.005 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 76 Resp: 5246

Ion	Ratio	Lower	Upper
76	100		
78	19.2	0.0	29.6

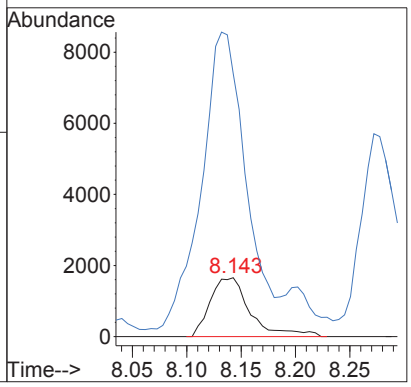


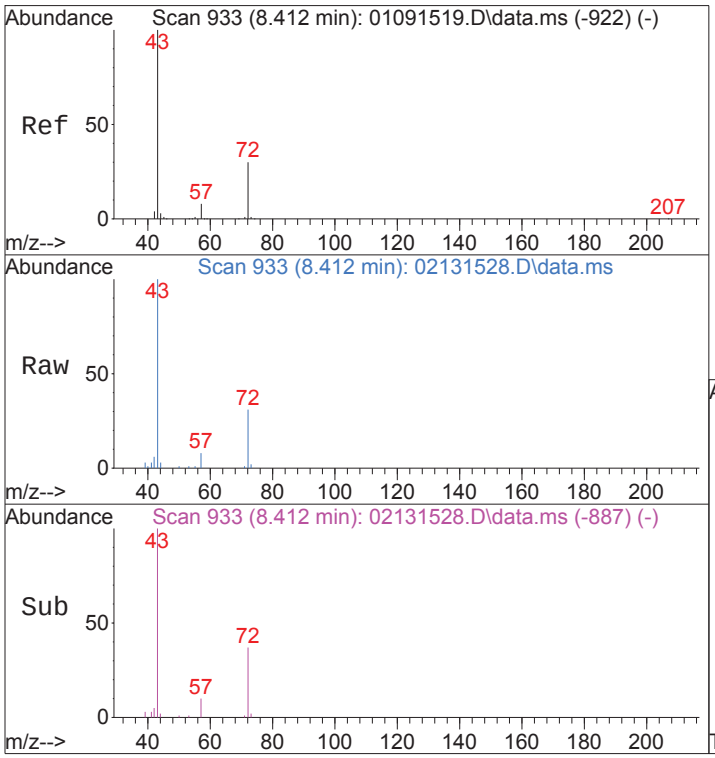


#26
Vinyl Acetate
Concen: 1.34 ng
RT: 8.14 min Scan# 883
Delta R.T. -0.038 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 86 Resp: 4239

Ion	Ratio	Lower	Upper
86	100		
43	559.9	927.5	967.5#

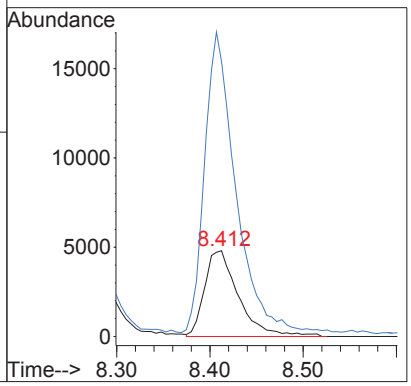


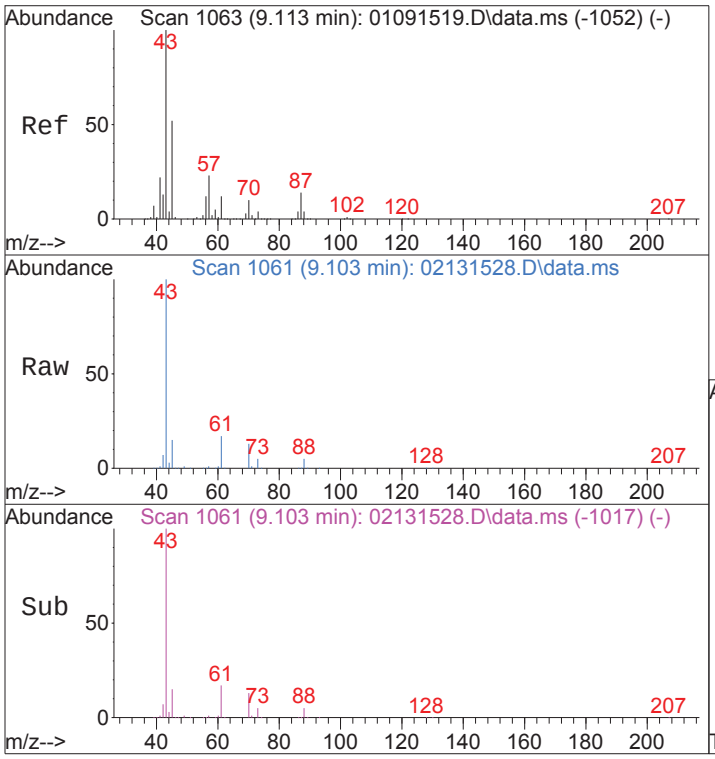


#27
2-Butanone (MEK)
Concen: 1.37 ng
RT: 8.41 min Scan# 933
Delta R.T. 0.000 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 72 Resp: 12166

Ion	Ratio	Lower	Upper
72	100		
43	321.0	315.1	355.1

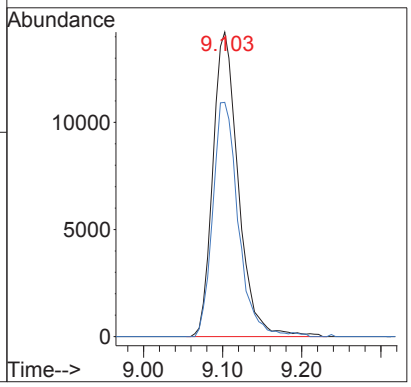


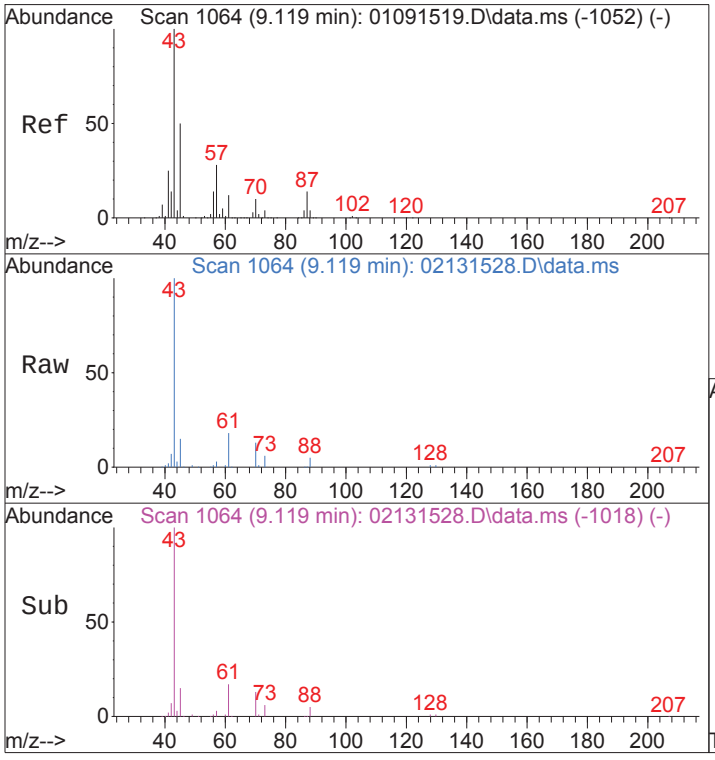


#30
Ethyl Acetate
Concen: 6.64 ng
RT: 9.10 min Scan# 1061
Delta R.T. -0.011 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 61 Resp: 31833

Ion	Ratio	Lower	Upper
61	100		
70	77.1	64.3	104.3

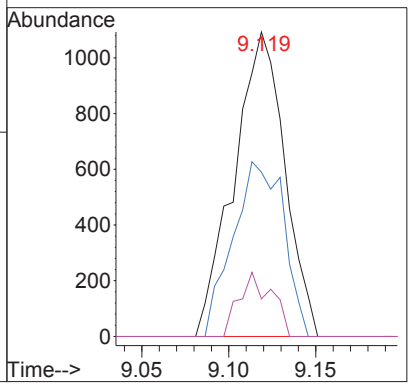


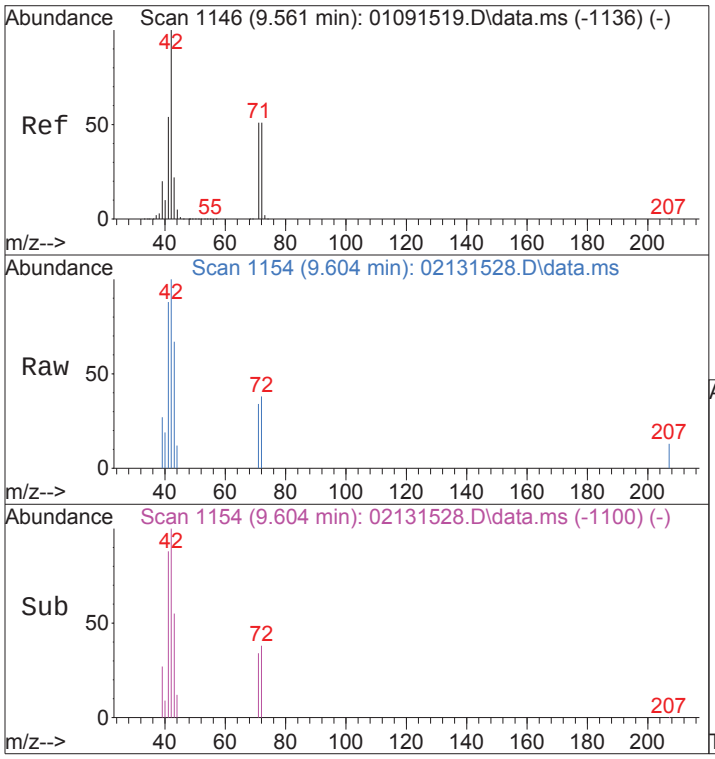


#31
n-Hexane
Concen: 0.10 ng
RT: 9.12 min Scan# 1064
Delta R.T. 0.000 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 57 Resp: 2217

Ion	Ratio	Lower	Upper
57	100		
56	57.4	40.9	61.3
86	13.5	13.0	19.4

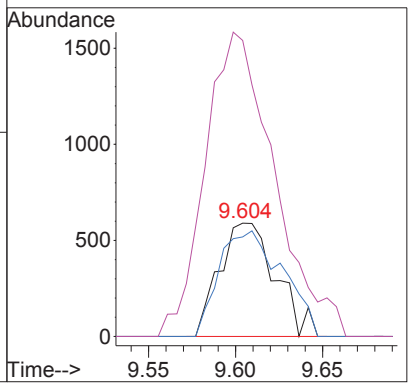


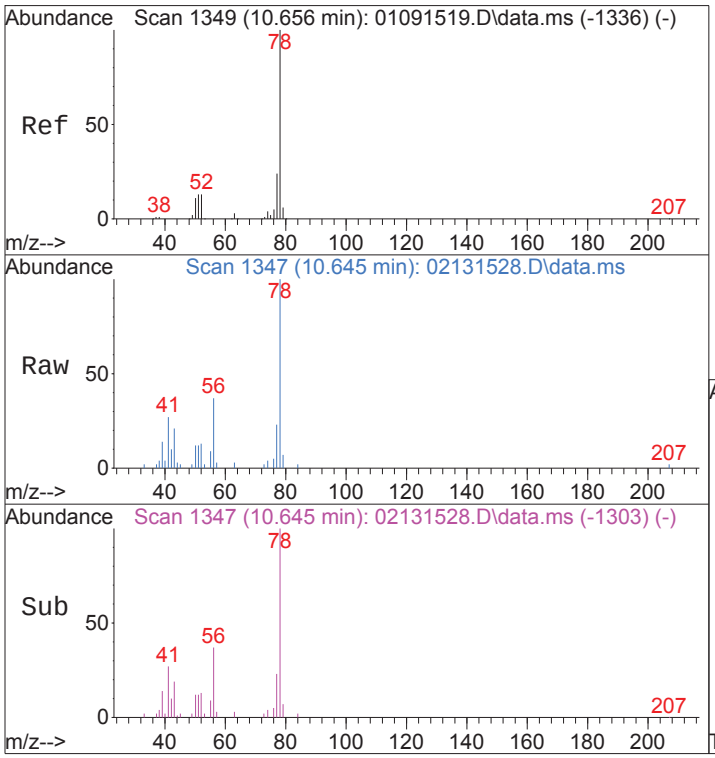


#34
Tetrahydrofuran (THF)
Concen: 0.14 ng
RT: 9.60 min Scan# 1154
Delta R.T. 0.043 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 72 Resp: 1328

Ion	Ratio	Lower	Upper
72	100		
71	105.2	78.0	118.0
42	330.3	171.6	211.6#

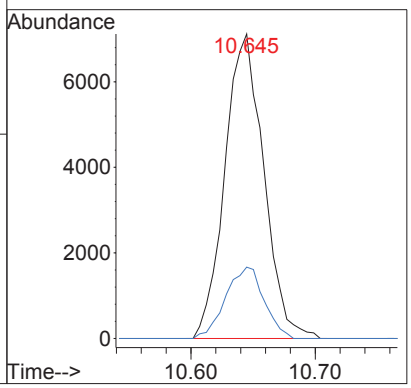


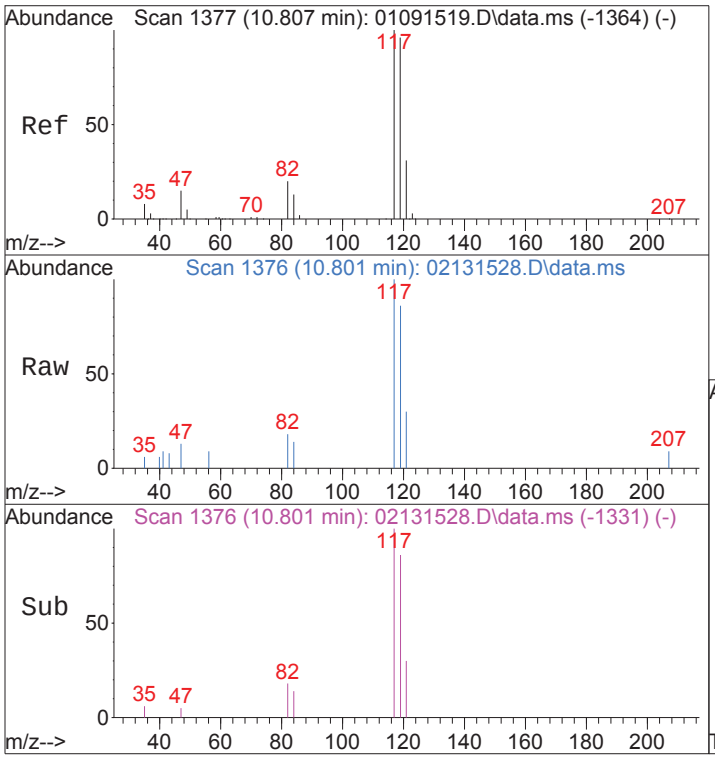


#41
Benzene
Concen: 0.24 ng
RT: 10.64 min Scan# 1347
Delta R.T. -0.011 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 78 Resp: 15466

Ion	Ratio	Lower	Upper
78	100		
77	23.1	3.6	43.6

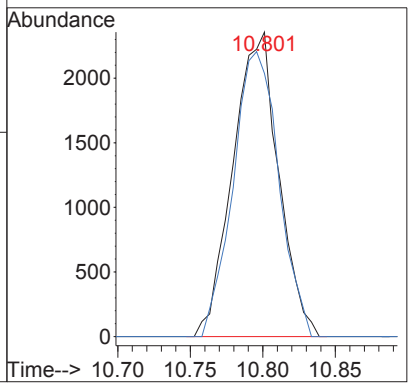


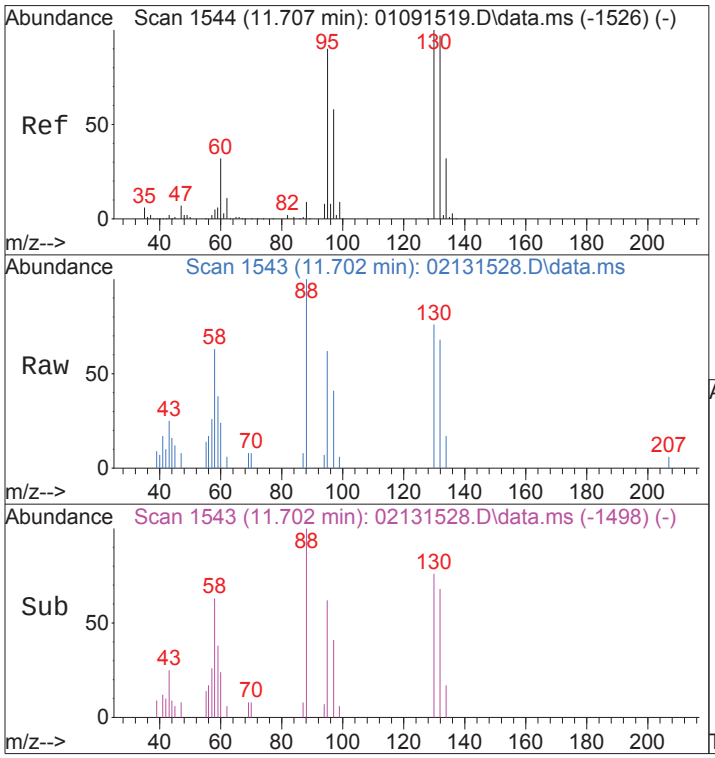


#42
Carbon Tetrachloride
Concen: 0.27 ng
RT: 10.80 min Scan# 1376
Delta R.T. -0.005 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion:117 Resp: 5168

Ion	Ratio	Lower	Upper
117	100		
119	93.5	76.6	116.6

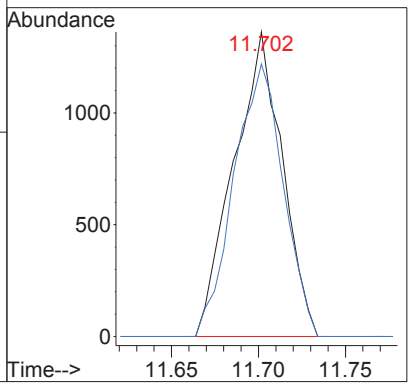


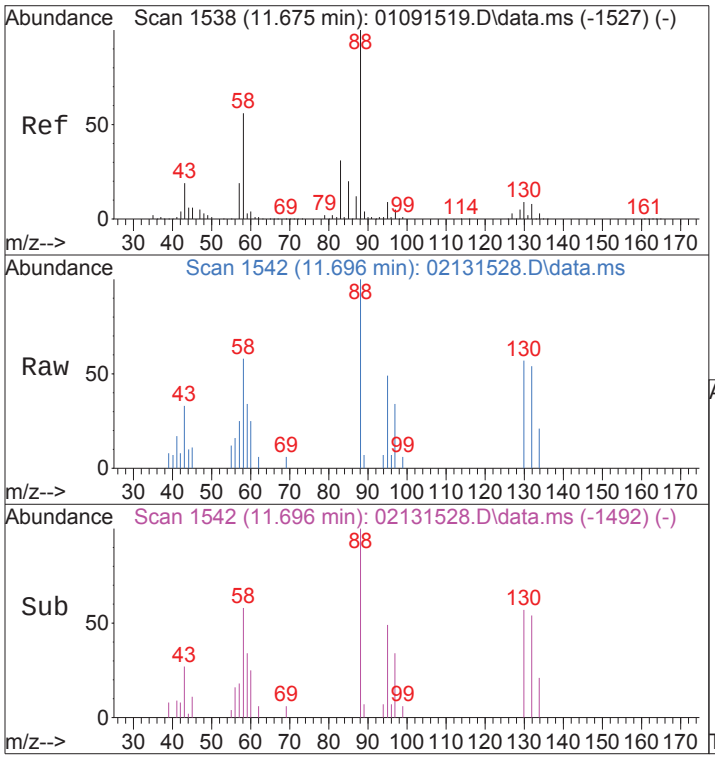


#47
Trichloroethene
Concen: 0.14 ng
RT: 11.70 min Scan# 1543
Delta R.T. -0.005 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion:130 Resp: 2636

Ion	Ratio	Lower	Upper
130	100		
132	90.9	76.1	116.1

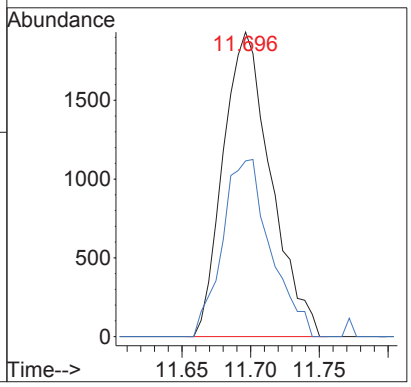


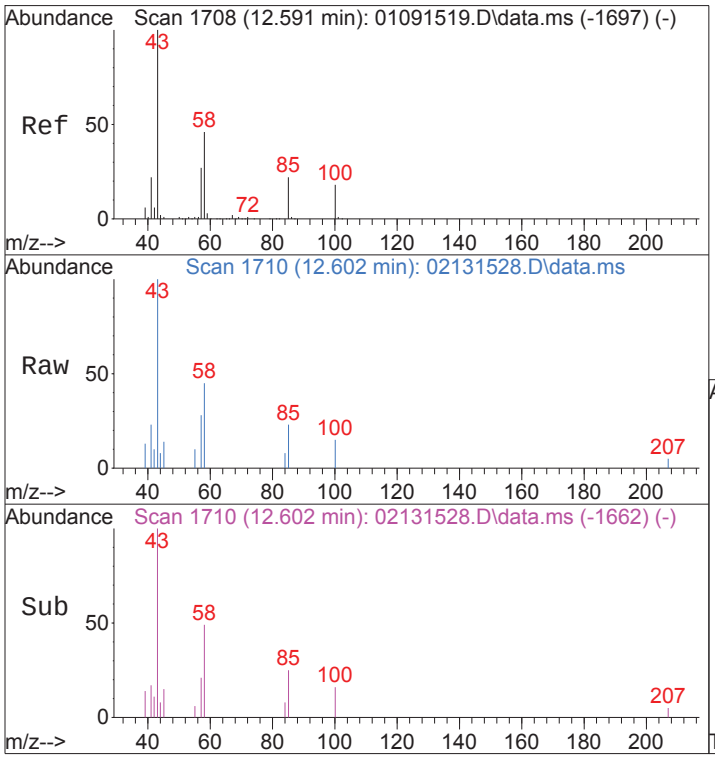


#48
1,4-Dioxane
Concen: 0.39 ng
RT: 11.70 min Scan# 1542
Delta R.T. 0.022 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 88 Resp: 4681

Ion	Ratio	Lower	Upper
88	100		
58	58.4	35.6	75.6

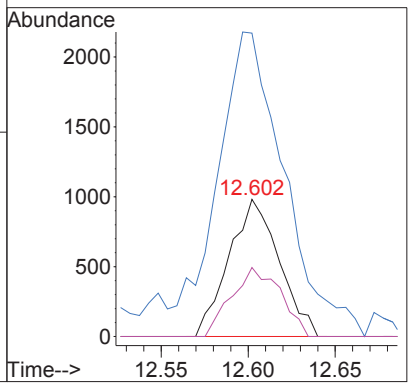


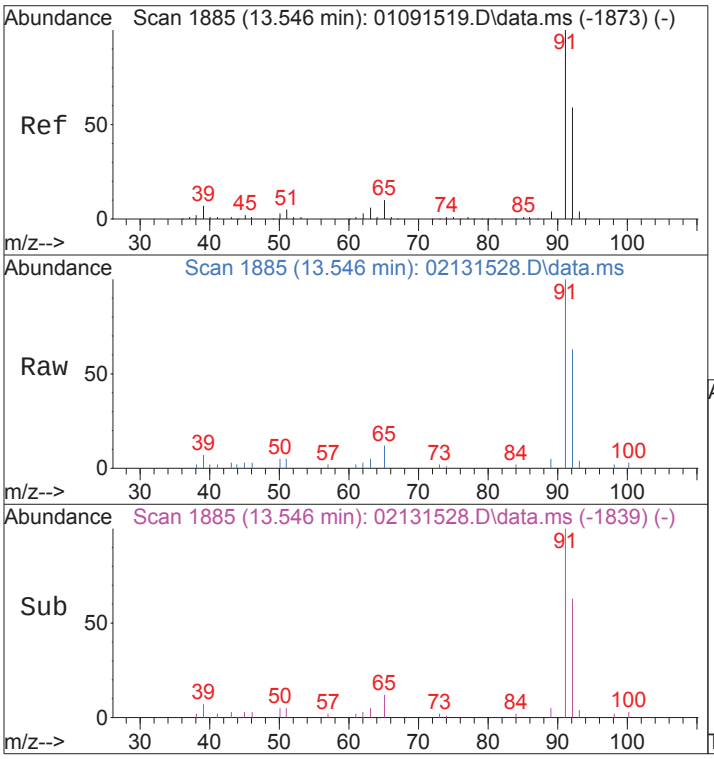


#53
4-Methyl-2-pentanone
Concen: 0.17 ng
RT: 12.60 min Scan# 1710
Delta R.T. 0.011 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 58 Resp: 1972

Ion	Ratio	Lower	Upper
58	100		
43	296.7	177.8	266.8#
85	48.9	40.1	60.1

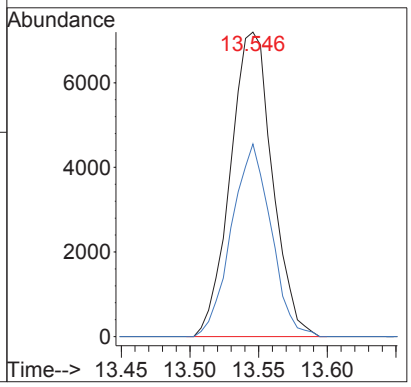


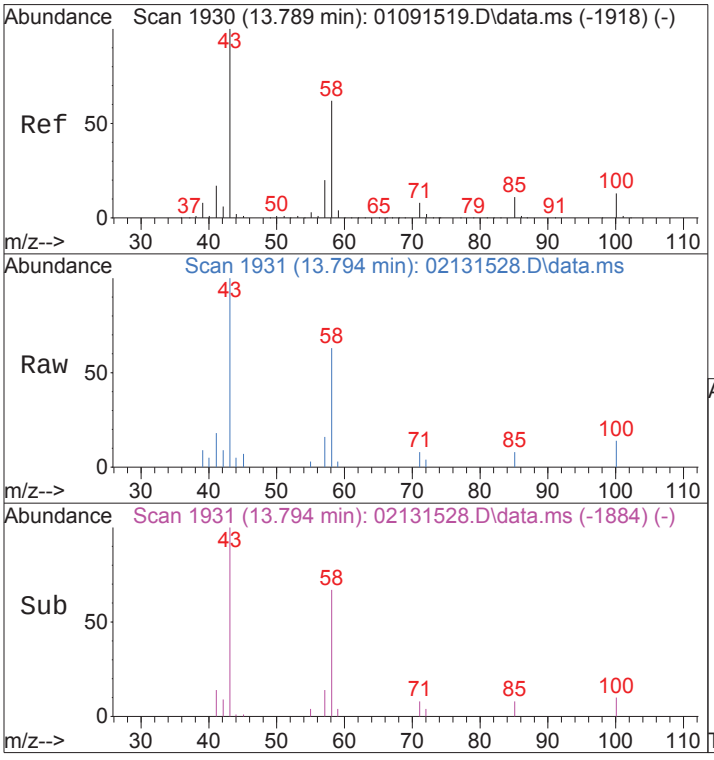


#58
Toluene
Concen: 0.23 ng
RT: 13.55 min Scan# 1885
Delta R.T. -0.000 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 91 Resp: 15324

Ion	Ratio	Lower	Upper
91	100		
92	59.4	39.0	79.0

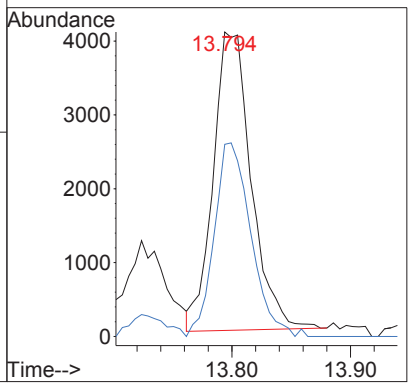


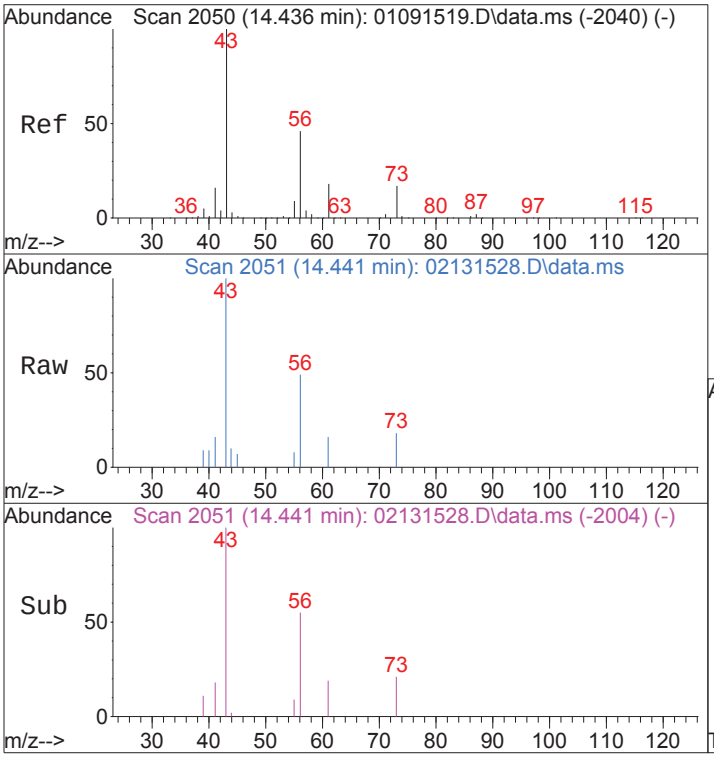


#59
2-Hexanone
Concen: 0.33 ng
RT: 13.79 min Scan# 1931
Delta R.T. 0.005 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 43 Resp: 9016

Ion	Ratio	Lower	Upper
43	100		
58	62.6	42.9	82.9

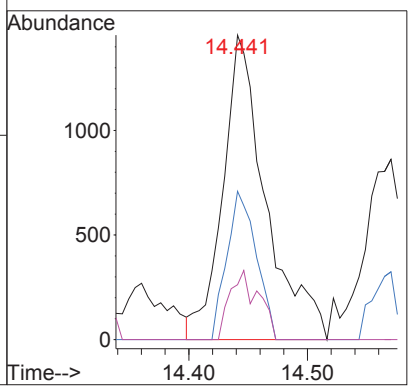


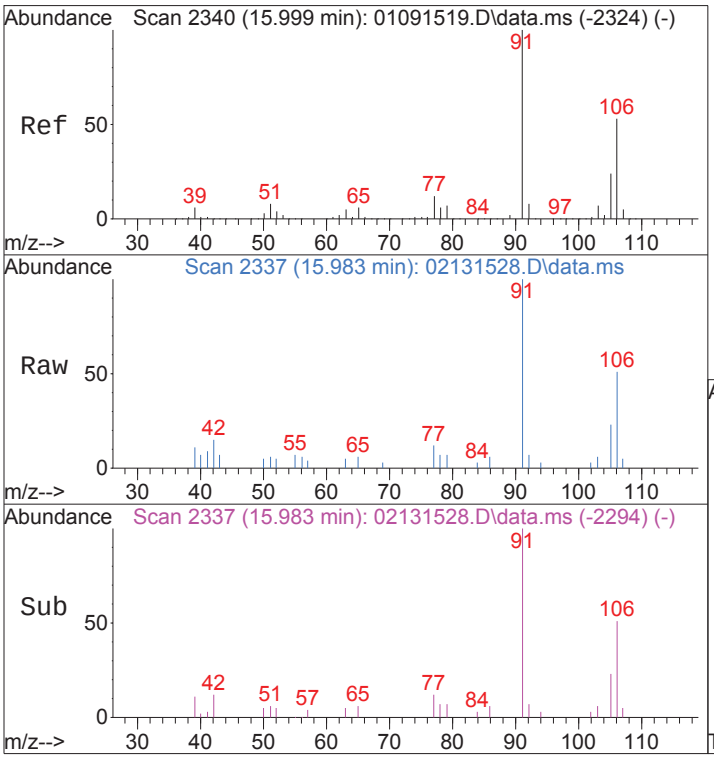


#62
n-Butyl Acetate
Concen: 0.13 ng
RT: 14.44 min Scan# 2051
Delta R.T. 0.005 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 43 Resp: 3670

Ion	Ratio	Lower	Upper
43	100		
56	33.4	25.7	65.7
73	15.2	0.0	37.0

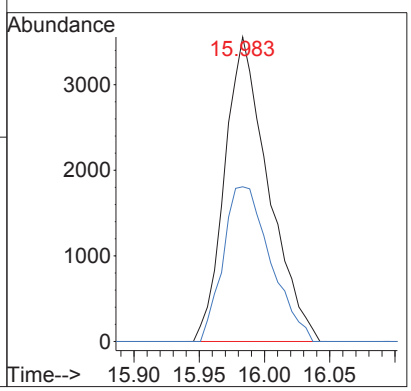


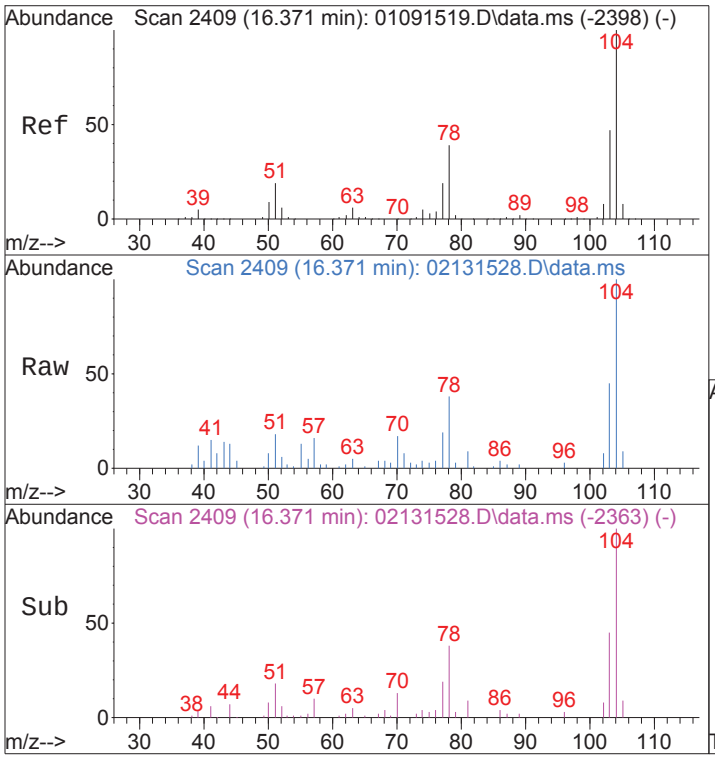


#67
m- p- ylenes
Concen: 0.14 ng
RT: 15.98 min Scan# 2337
Delta R.T. -0.016 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 91 Resp: 8277

Ion	Ratio	Lower	Upper
91	100		
106	55.2	31.8	71.8

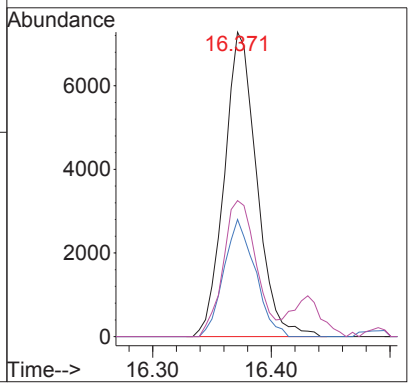


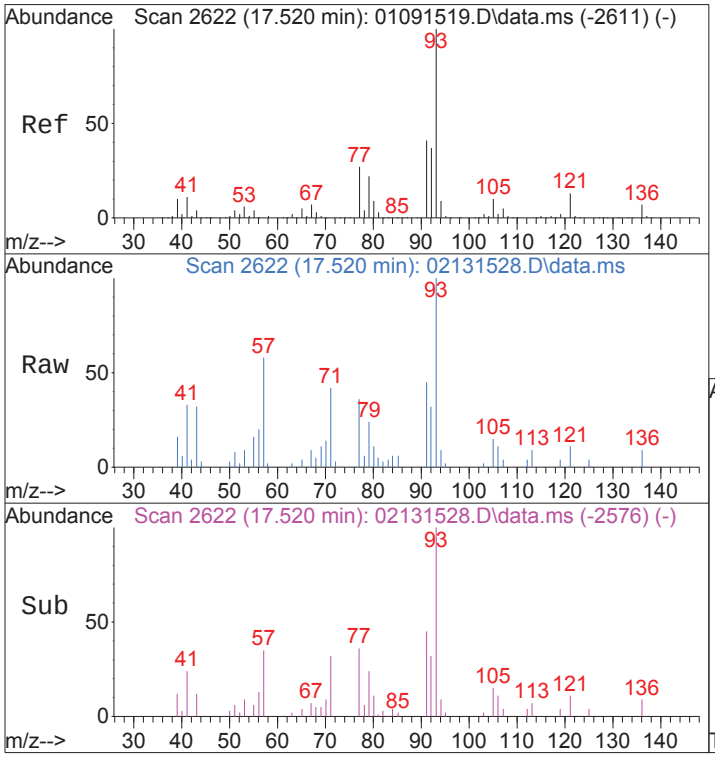


#69
Styrene
Concen: 0.29 ng
RT: 16.37 min Scan# 2409
Delta R.T. -0.000 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion:104 Resp: 13876

Ion	Ratio	Lower	Upper
104	100		
78	37.1	17.9	57.9
103	46.4	27.3	67.3

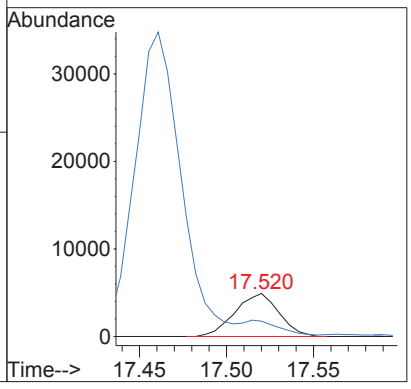


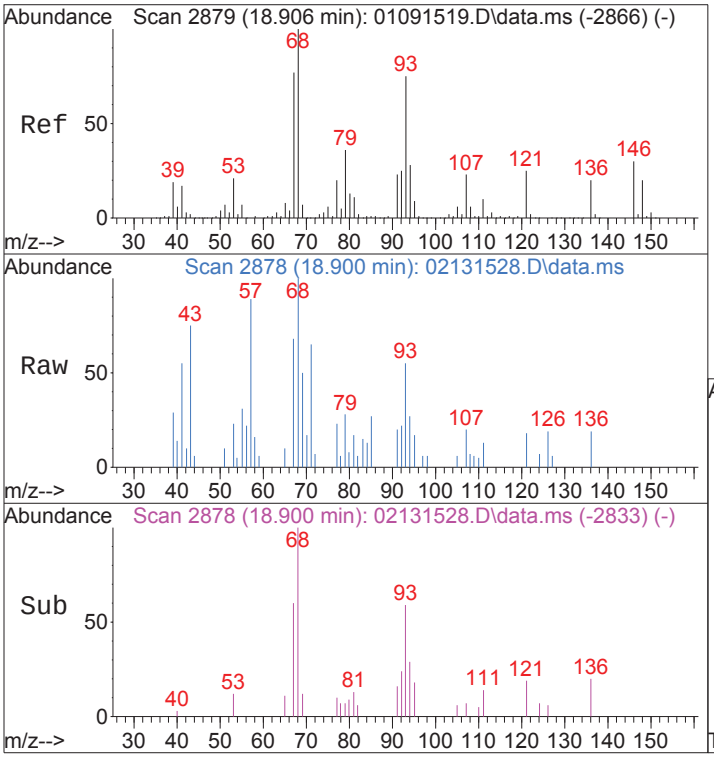


#75
alpha-Pinene
Concen: 0.22 ng
RT: 17.52 min Scan# 2622
Delta R.T. 0.000 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 93 Resp: 8593

Ion	Ratio	Lower	Upper
93	100		
77	770.5	7.7	47.7#

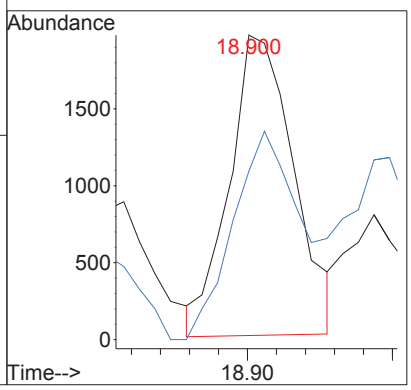




#91
d-Limonene
Concen: 0.13 ng
RT: 18.90 min Scan# 2878
Delta R.T. -0.005 min
Lab File: 02131528.D
Acq: 13 Feb 2015 21:41

Tgt Ion: 68 Resp: 3013

Ion	Ratio	Lower	Upper
68	100		
93	76.1	56.4	96.4



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131528.D
Acq On : 13 Feb 2015 21:41 Operator: SC
Sample : P1500369-004 (1000ml)
Misc : S29-01081512
ALS Vial : 8 Sample Multiplier: 1

2/16/15

Quant Time: Feb 16 10:25:25 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

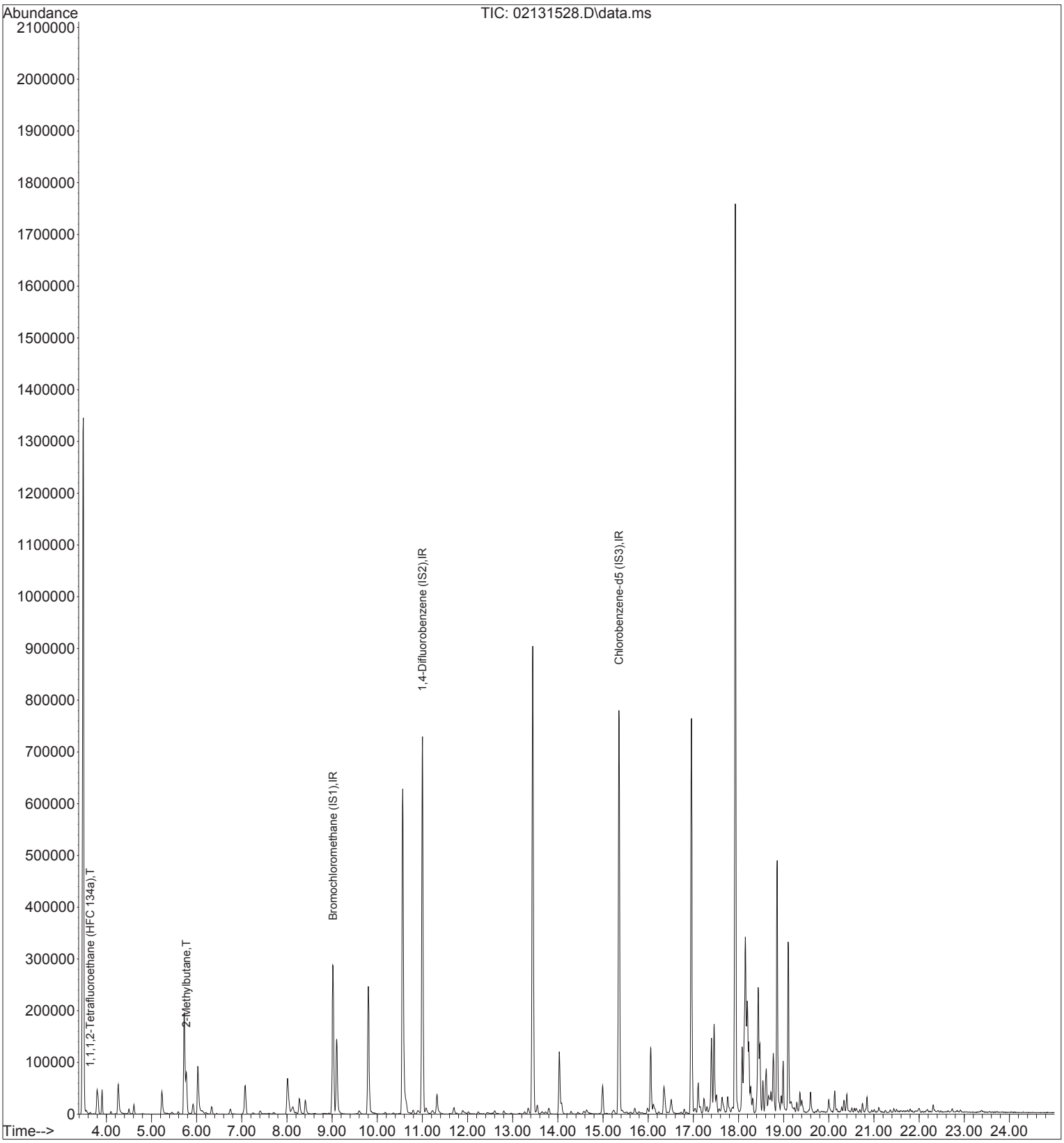
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	146211	12.500	ng		-0.01
16) 1,4-Difluorobenzene (IS2)	11.00	114	764809	12.500	ng		0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	293613	12.500	ng		0.00
Target Compounds							Qvalue
2) Chloropentafluoroethane	3.58	85	376	N.D.			
3) 1,1,1,2-Tetrafluoroeth...	3.65	83	1350	0.124	ng	#	73
4) 1,1-Difluoroethane	3.72	65	146	N.D.			
5) Chlorodifluoromethane ...	0.00	67	0	N.D.	d		
6) 1-Chloro-1,1-Difluoroe...	4.10	65	1121	N.D.			
7) Dichlorofluoromethane ...	0.00	67	0	N.D.			
8) Vinylbromide	0.00	108	0	N.D.			
9) 2,2-Dichloro-1,1,1-tri...	0.00	83	0	N.D.			
10) 2-Methylbutane	5.78	57	25502	2.171	ng		89
11) Methyl Acetate	0.00	43	0	N.D.	d		
12) 2-Methylpentane	8.21	71	572	N.D.			
13) 2,2-Dichloropropane	0.00	77	0	N.D.			
14) 1,1-Dichloropropene	10.55	75	36	N.D.			
15) Thiophene	10.80	84	682	N.D.			
17) 2,3-Dimethylpentane	11.19	56	83	N.D.			
18) Dibromomethane	0.00	174	0	N.D.			
20) Methyl Cyclohexane	12.69	55	452	N.D.			
21) 1,3-Dichloropropane	0.00	76	0	N.D.	d		
22) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.			
23) 1-Chlorohexane	15.59	91	367	N.D.			
24) 1,2,3-Trichloropropane	16.51	75	1487	N.D.			
25) Bromobenzene	17.10	77	159	N.D.			
26) 2-Chlorotoluene	17.63	91	2365	N.D.			
27) 4-Chlorotoluene	17.63	91	2365	N.D.			
28) Indan	18.95	117	440	N.D.			
29) Indene	18.96	115	95	N.D.			
30) 1,2,4,5-Tetramethylben...	19.99	119	556	N.D.			
31) 1,2,3,4-Tetramethylben...	20.04	119	932	N.D.			
32) 1,2,3,5-Tetramethylben...	20.43	119	595	N.D.			
33) 1,2,3-Trichlorobenzene	0.00	180	0	N.D.			

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131528.D
Acq On : 13 Feb 2015 21:41 Operator: SC
Sample : P1500369-004 (1000ml)
Misc : S29-01081512
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Feb 16 10:25:25 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131504.D
Acq On : 13 Feb 2015 7:22 Operator: SC
Sample : MB R9021315_1000ml
Misc : S29-01081512
ALS Vial : 2 Sample Multiplier: 1

2/13/15

Quant Time: Feb 13 08:57:33 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	142191	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.00	114	730344	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	270786	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	186191	11.875	ng		-0.02
Spiked Amount 12.500			Recovery = 95.04%				
57) Toluene-d8 (SS2)	13.44	98	689021	12.351	ng		0.00
Spiked Amount 12.500			Recovery = 98.80%				
73) Bromofluorobenzene (SS3)	16.96	174	281309	13.452	ng		0.00
Spiked Amount 12.500			Recovery = 107.60%				
Target Compounds							Qvalue
2) Propene	3.85	42	466	N.D.			
3) Dichlorodifluoromethan...	0.00	85	0	N.D.			
4) Chloromethane	0.00	50	0	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	5.29	45	655	N.D.			
11) Acetonitrile	5.50	41	260	N.D.			
12) Acrolein	5.65	56	255	N.D.			
13) Acetone	5.78	58	5958	0.631	ng	#	69
14) Trichlorofluoromethane	0.00	101	0	N.D.			
15) 2-Propanol (Isopropanol)	6.13	45	79	N.D.			
16) Acrylonitrile	0.00	53	0	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.			
19) Methylene Chloride	6.76	84	1163	N.D.			
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.			
21) Trichlorotrifluoroethane	0.00	151	0	N.D.			
22) Carbon Disulfide	7.07	76	301	N.D.			
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D. d			
27) 2-Butanone (MEK)	0.00	72	0	N.D. d			
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	0.00	61	0	N.D.			
31) n-Hexane	0.00	57	0	N.D.			
32) Chloroform	0.00	83	0	N.D.			
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.			
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	10.68	56	81	N.D.			
41) Benzene	10.66	78	1460	N.D.			
42) Carbon Tetrachloride	0.00	117	0	N.D.			
43) Cyclohexane	10.99	84	357	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.			
47) Trichloroethene	0.00	130	0	N.D.			
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.			

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131504.D
Acq On : 13 Feb 2015 7:22 Operator: SC
Sample : MB R9021315_1000ml
Misc : S29-01081512
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 13 08:57:33 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

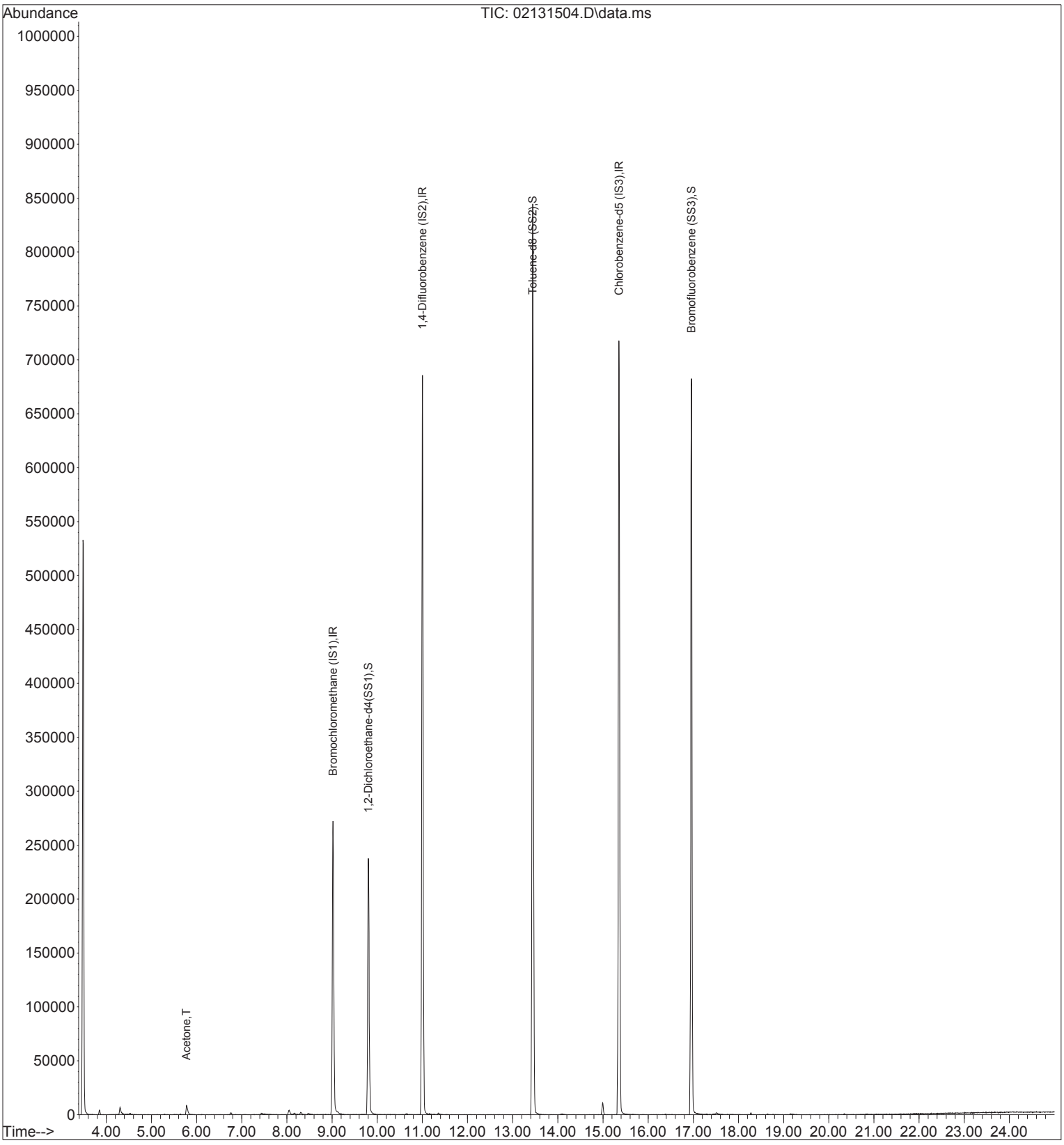
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	0.00	100	0	N.D.		
51) n-Heptane	0.00	71	0	N.D.		
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	13.55	91	539	N.D.		
59) 2-Hexanone	0.00	43	0	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	0.00	43	0	N.D.		
63) n-Octane	0.00	57	0	N.D.		
64) Tetrachloroethene	0.00	166	0	N.D.		
65) Chlorobenzene	0.00	112	0	N.D.		
66) Ethylbenzene	15.83	91	40	N.D.		
67) m- p- ylenes	16.02	91	37	N.D.		
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	0.00	104	0	N.D.		
70) o- ylene	16.51	91	44	N.D.		
71) n-Nonane	0.00	43	0	N.D.		
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.		
74) Cumene	16.95	105	135	N.D.		
75) alpha-Pinene	0.00	93	0	N.D.		
76) n-Propylbenzene	17.64	91	76	N.D.		
77) 3-Ethyltoluene	17.76	105	211	N.D.		
78) 4-Ethyltoluene	17.81	105	152	N.D.		
79) 1,3,5-Trimethylbenzene	17.88	105	74	N.D.		
80) alpha-Methylstyrene	0.00	118	0	N.D.		
81) 2-Ethyltoluene	17.88	105	74	N.D.		
82) 1,2,4-Trimethylbenzene	18.32	105	36	N.D.		
83) n-Decane	18.64	57	430	N.D.		
84) Benzyl Chloride	0.00	91	0	N.D.		
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.		
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.		
87) sec-Butylbenzene	0.00	105	0	N.D.		
88) 4-Isopropyltoluene (p-...	18.76	119	140	N.D.		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.		
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	0.00	68	0	N.D.		
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	0.00	57	0	N.D.		
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.		
95) Naphthalene	20.85	128	553	N.D.		
96) n-Dodecane	20.85	57	35	N.D.		
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	16.19	55	32	N.D.		
99) tert-Butylbenzene	0.00	119	0	N.D.		
100) n-Butylbenzene	0.00	91	0	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131504.D
Acq On : 13 Feb 2015 7:22 Operator: SC
Sample : MB R9021315_1000ml
Misc : S29-01081512
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 13 08:57:33 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131504.D
Acq On : 13 Feb 2015 7:22 Operator: SC
Sample : MB R9021315_1000ml
Misc : S29-01081512
ALS Vial : 2 Sample Multiplier: 1

2/13/15

Quant Time: Feb 13 15:04:23 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

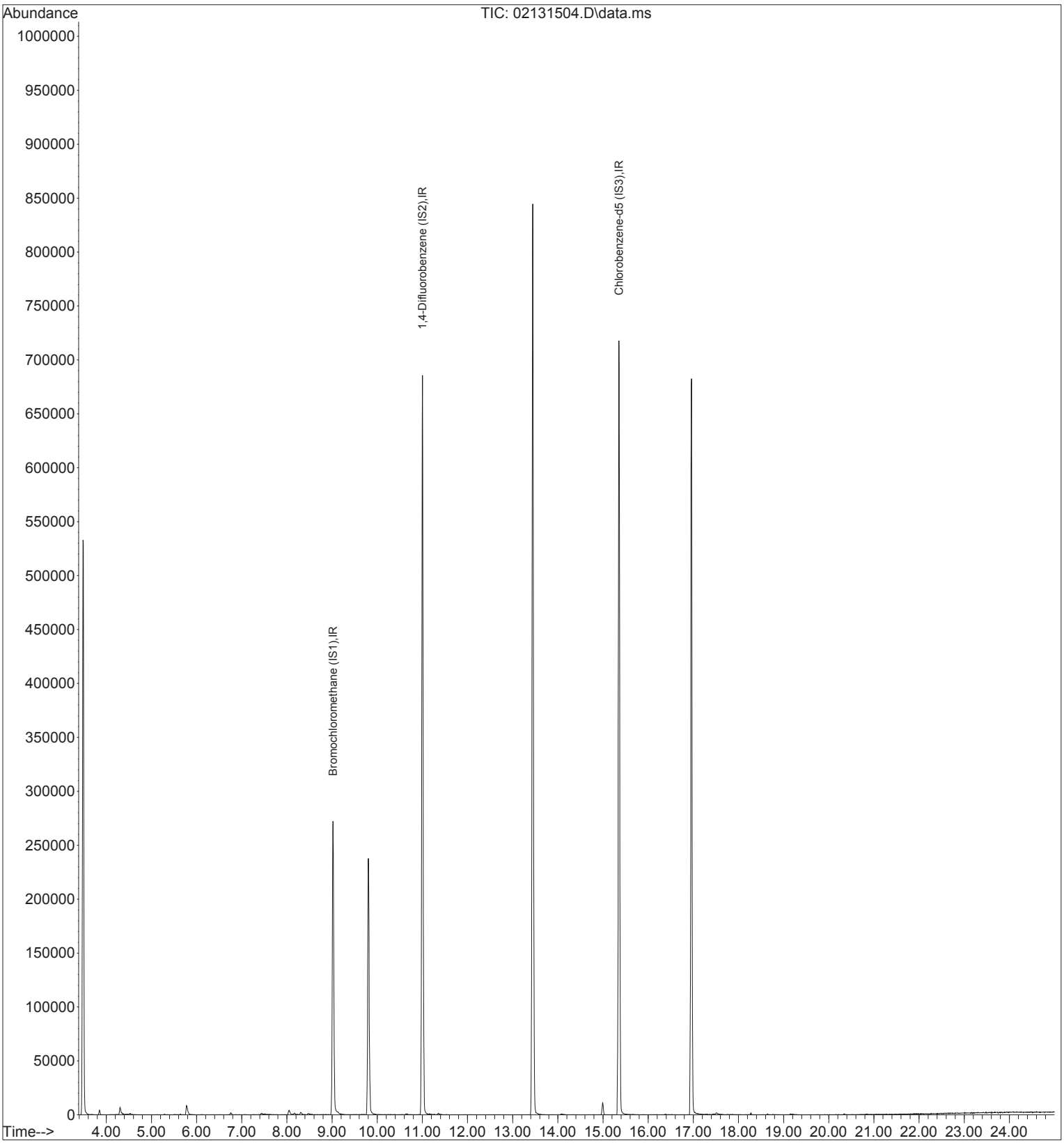
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	142191	12.500	ng	-0.01
16) 1,4-Difluorobenzene (IS2)	11.00	114	730586	12.500	ng	0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	270756	12.500	ng	0.00
Target Compounds						Qvalue
2) Chloropentafluoroethane	0.00	85	0	N.D.		
3) 1,1,1,2-Tetrafluoroeth...	0.00	83	0	N.D.		
4) 1,1-Difluoroethane	0.00	65	0	N.D.		
5) Chlorodifluoromethane ...	0.00	67	0	N.D.		
6) 1-Chloro-1,1-Difluoroe...	0.00	65	0	N.D.		
7) Dichlorofluoromethane ...	0.00	67	0	N.D.		
8) Vinylbromide	0.00	108	0	N.D.		
9) 2,2-Dichloro-1,1,1-tri...	0.00	83	0	N.D.		
10) 2-Methylbutane	5.80	57	308	N.D.		
11) Methyl Acetate	0.00	43	0	N.D.		
12) 2-Methylpentane	0.00	71	0	N.D.		
13) 2,2-Dichloropropane	0.00	77	0	N.D.		
14) 1,1-Dichloropropene	0.00	75	0	N.D.		
15) Thiophene	0.00	84	0	N.D.		
17) 2,3-Dimethylpentane	0.00	56	0	N.D.		
18) Dibromomethane	0.00	174	0	N.D.		
20) Methyl Cyclohexane	0.00	55	0	N.D.		
21) 1,3-Dichloropropane	0.00	76	0	N.D.	d	
22) 1,1,1,2-Tetrachloroethane	0.00	131	0	N.D.		
23) 1-Chlorohexane	0.00	91	0	N.D.		
24) 1,2,3-Trichloropropane	0.00	75	0	N.D.		
25) Bromobenzene	0.00	77	0	N.D.		
26) 2-Chlorotoluene	17.64	91	76	N.D.		
27) 4-Chlorotoluene	17.64	91	76	N.D.		
28) Indan	0.00	117	0	N.D.		
29) Indene	19.07	115	37	N.D.		
30) 1,2,4,5-Tetramethylben...	20.01	119	43	N.D.		
31) 1,2,3,4-Tetramethylben...	20.01	119	43	N.D.		
32) 1,2,3,5-Tetramethylben...	0.00	119	0	N.D.		
33) 1,2,3-Trichlorobenzene	21.10	180	73	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131504.D
Acq On : 13 Feb 2015 7:22 Operator: SC
Sample : MB R9021315_1000ml
Misc : S29-01081512
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 13 15:04:23 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131505.D
Acq On : 13 Feb 2015 7:55 Operator: SC
Sample : LCS R9021315_25ng
Misc : S29-01081512/S29-01221502 (2/20)
ALS Vial : 4 Sample Multiplier: 1

2/13/15

Quant Time: Feb 13 08:59:11 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.04	130	151242	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	11.01	114	759953	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.36	82	276986	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.82	65	193441	11.599	ng		0.00
Spiked Amount 12.500			Recovery = 92.80%				
57) Toluene-d8 (SS2)	13.45	98	714650	12.523	ng		0.00
Spiked Amount 12.500			Recovery = 100.16%				
73) Bromofluorobenzene (SS3)	16.96	174	289895	13.552	ng		0.00
Spiked Amount 12.500			Recovery = 108.40%				
Target Compounds							Qvalue
2) Propene	3.79	42	253283	19.922	ng		99
3) Dichlorodifluoromethan...	3.90	85	620386	21.022	ng		100
4) Chloromethane	4.09	50	380258	20.069	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.25	135	395500	22.648	ng		100
6) Vinyl Chloride	4.37	62	452883	21.467	ng		99
7) 1,3-Butadiene	4.55	54	304854	22.440	ng		98
8) Bromomethane	4.85	94	319221	21.297	ng		99
9) Chloroethane	5.06	64	223610	21.054	ng		99
10) Ethanol	5.27	45	974472	102.028	ng		100
11) Acetonitrile	5.47	41	493051	21.846	ng		100
12) Acrolein	5.60	56	181365	24.455	ng		99
13) Acetone	5.74	58	1093565	108.811	ng		95
14) Trichlorofluoromethane	5.93	101	542165	22.813	ng		100
15) 2-Propanol (Isopropanol)	6.06	45	1430685	45.630	ng		99
16) Acrylonitrile	6.27	53	395100	24.591	ng		100
17) 1,1-Dichloroethene	6.62	96	342106	23.317	ng		96
18) 2-Methyl-2-Propanol (t...	6.71	59	1479200	43.659	ng		99
19) Methylene Chloride	6.77	84	347519	21.767	ng		96
20) 3-Chloro-1-propene (Al...	6.89	41	389778	22.468	ng		97
21) Trichlorotrifluoroethane	7.08	151	309299	22.698	ng		98
22) Carbon Disulfide	7.04	76	1232768	24.345	ng		100
23) trans-1,2-Dichloroethene	7.79	61	445509	23.267	ng		97
24) 1,1-Dichloroethane	8.00	63	547325	22.072	ng		99
25) Methyl tert-Butyl Ether	8.06	73	970358	22.692	ng		100
26) Vinyl Acetate	8.18	86	409099	125.424	ng	#	94
27) 2-Butanone (MEK)	8.41	72	228076	24.895	ng		97
28) cis-1,2-Dichloroethene	8.88	61	420280	21.171	ng		97
29) Diisopropyl Ether	9.11	87	296235	21.488	ng	#	94
30) Ethyl Acetate	9.11	61	234895	47.347	ng		99
31) n-Hexane	9.12	57	512555	22.370	ng		100
32) Chloroform	9.18	83	562448	22.762	ng		99
34) Tetrahydrofuran (THF)	9.56	72	210842	21.890	ng		98
35) Ethyl tert-Butyl Ether	9.66	87	417129	22.799	ng		98
36) 1,2-Dichloroethane	9.93	62	371963	21.363	ng		100
38) 1,1,1-Trichloroethane	10.20	97	495708	22.084	ng		99
39) Isopropyl Acetate	10.56	61	404546	51.538	ng		96
40) 1-Butanol	10.57	56	673670	53.482	ng		99
41) Benzene	10.65	78	1364400	21.512	ng		100
42) Carbon Tetrachloride	10.80	117	461048	24.294	ng		100
43) Cyclohexane	10.94	84	1061568	46.061	ng		98
44) tert-Amyl Methyl Ether	11.25	73	957569	23.252	ng		99
45) 1,2-Dichloropropane	11.47	63	319814	22.748	ng		100
46) Bromodichloromethane	11.65	83	455527	23.671	ng		100
47) Trichloroethene	11.71	130	417731	22.976	ng		100
48) 1,4-Dioxane	11.67	88	295886	24.492	ng		98
49) 2,2,4-Trimethylpentane...	11.77	57	1302651	22.217	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131505.D
Acq On : 13 Feb 2015 7:55 Operator: SC
Sample : LCS R9021315_25ng
Misc : S29-01081512/S29-01221502 (2/20)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Feb 13 08:59:11 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

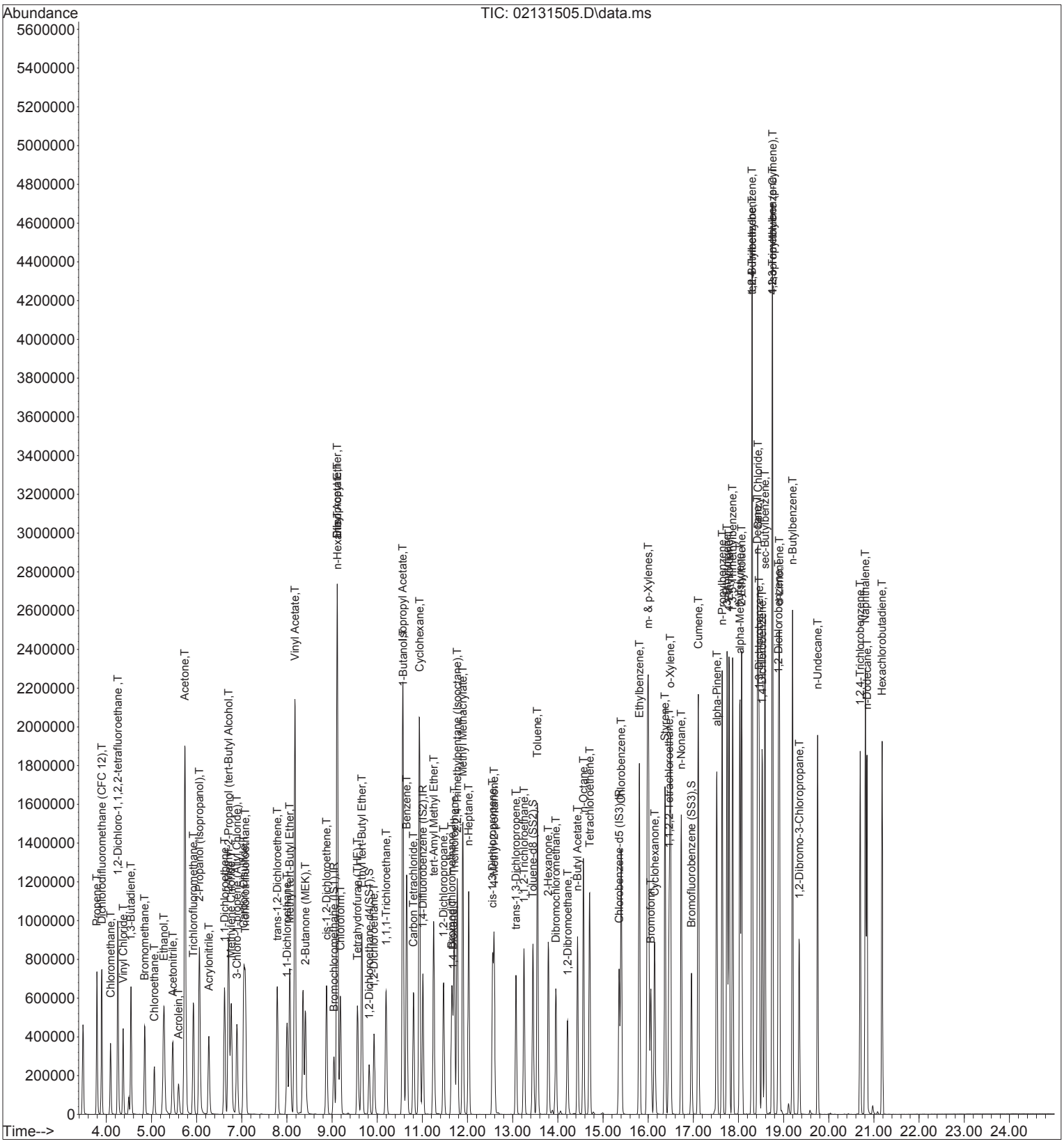
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.90	100	313432	50.910	ng	98
51) n-Heptane	12.03	71	341499	23.679	ng	100
52) cis-1,3-Dichloropropene	12.55	75	577797	26.285	ng	100
53) 4-Methyl-2-pentanone	12.59	58	302516	25.777	ng	98
54) trans-1,3-Dichloropropene	13.07	75	495084	26.117	ng	100
55) 1,1,2-Trichloroethane	13.25	97	356656	23.933	ng	99
58) Toluene	13.55	91	1487696	23.196	ng	100
59) 2-Hexanone	13.79	43	651435	25.165	ng	99
60) Dibromochloromethane	13.96	129	445812	25.420	ng	100
61) 1,2-Dibromoethane	14.21	107	413957	24.787	ng	100
62) n-Butyl Acetate	14.44	43	723584	26.247	ng	99
63) n-Octane	14.57	57	271180	23.079	ng	98
64) Tetrachloroethene	14.71	166	465269	22.217	ng	99
65) Chlorobenzene	15.40	112	1030392	23.804	ng	100
66) Ethylbenzene	15.81	91	1648279	23.317	ng	99
67) m- p- ylenes	16.00	91	2632113	46.086	ng	99
68) Bromoform	16.06	173	419501	28.074	ng	100
69) Styrene	16.37	104	1104714	24.664	ng	99
70) o- ylene	16.49	91	1327613	22.659	ng	99
71) n-Nonane	16.73	43	568082	21.913	ng	99
72) 1,1,2,2-Tetrachloroethane	16.46	83	626138	23.747	ng	100
74) Cumene	17.11	105	1740067	22.491	ng	100
75) alpha-Pinene	17.52	93	860315	23.175	ng	100
76) n-Propylbenzene	17.64	91	2033999	22.433	ng	99
77) 3-Ethyltoluene	17.75	105	1731691	23.357	ng	100
78) 4-Ethyltoluene	17.79	105	1740840	24.191	ng	100
79) 1,3,5-Trimethylbenzene	17.87	105	1450672	22.890	ng	99
80) alpha-Methylstyrene	18.03	118	812045	23.702	ng	100
81) 2-Ethyltoluene	18.07	105	1701008	23.374	ng	100
82) 1,2,4-Trimethylbenzene	18.30	105	1468908	23.627	ng	99
83) n-Decane	18.42	57	662058	22.476	ng	99
84) Benzyl Chloride	18.43	91	1312947	27.743	ng	99
85) 1,3-Dichlorobenzene	18.46	146	941822	24.626	ng	99
86) 1,4-Dichlorobenzene	18.52	146	943868	22.818	ng	100
87) sec-Butylbenzene	18.59	105	1980837	24.067	ng	99
88) 4-Isopropyltoluene (p-...	18.76	119	1836268	23.296	ng	99
89) 1,2,3-Trimethylbenzene	18.75	105	1519112	23.140	ng	99
90) 1,2-Dichlorobenzene	18.88	146	899353	23.765	ng	100
91) d-Limonene	18.91	68	509650	23.636	ng	100
92) 1,2-Dibromo-3-Chloropr...	19.35	157	336580	26.248	ng	95
93) n-Undecane	19.75	57	653347	21.243	ng	99
94) 1,2,4-Trichlorobenzene	20.70	180	656511	22.492	ng	100
95) Naphthalene	20.81	128	1955784	21.586	ng	100
96) n-Dodecane	20.85	57	597870	20.672	ng	100
97) Hexachlorobutadiene	21.18	225	412085	22.826	ng	100
98) Cyclohexanone	16.15	55	448170	26.050	ng	98
99) tert-Butylbenzene	18.30	119	1478029	23.715	ng	100
100) n-Butylbenzene	19.20	91	1526520	24.495	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131505.D
Acq On : 13 Feb 2015 7:55 Operator: SC
Sample : LCS R9021315_25ng
Misc : S29-01081512/S29-01221502 (2/20)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Feb 13 08:59:11 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Response Factor Report MS09

Method Path : I:\MS09\Methods\
Method File : R9010915.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Mon an 12 09:19:02 2015
Response Via : Initial Calibration

Calibration Files
0.08=01091513.D 0.10=01091514.D 0.20=01091515.D 0.40=01091516.D 1.0 =01091517.D 5.0 =01091518.D 25 =01091519.D
50 =01091520.D 100 =01091521.D

		Compound	0.08	0.10	0.20	0.40	1.0	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------	ISTD	----------								
2)	T	Propene	1.207	1.227	1.057	0.986	1.058	0.930	1.001	0.983	1.009	1.051	9.68
3)	T	Dichlorodifluo...	2.985	2.749	2.508	2.352	2.489	2.187	2.345	2.229	2.109	2.439	11.55
4)	T	Chloromethane	2.008	1.941	1.597	1.569	1.712	1.374	1.542	1.327	1.024	1.566	19.51
5)	T	1,2-Dichloro-1...	1.743	1.717	1.497	1.379	1.480	1.265	1.353	1.319	1.236	1.443	12.76
6)	T	Vinyl Chloride	2.157	2.056	1.740	1.694	1.789	1.548	1.650	1.598	1.460	1.744	13.17
7)	T	1,3-Butadiene	1.272	1.313	1.104	1.020	1.141	1.004	1.145	1.107	0.999	1.123	9.94
8)	T	Bromomethane	1.474	1.436	1.294	1.218	1.237	1.104	1.228	1.133	1.026	1.239	11.86
9)	T	Chloroethane	0.982	0.968	0.937	0.874	0.901	0.796	0.872	0.815	0.755	0.878	8.90
10)	T	Ethanol	0.957	0.883	0.782	0.745	0.833	0.718	0.787	0.731	0.668	0.789	11.36
11)	T	Acetonitrile	2.196	2.050	1.863	1.811	1.900	1.688	1.845	1.778	1.658	1.865	9.09
12)	T	Acrolein	0.776	0.638	0.573	0.585	0.633	0.544	0.614	0.596	0.559	0.613	11.23
13)	T	Acetone	1.099	1.003	0.871	0.821	0.813	0.732	0.771	0.721	0.646	0.831	17.18
14)	T	Trichlorofluor...	2.392	2.244	1.982	1.850	2.015	1.760	1.884	1.835	1.717	1.964	11.44
15)	T	2-Propanol (Is...	3.054	2.820	2.574	2.489	2.690	2.426	2.690	2.494	2.084	2.591	10.49
16)	T	Acrylonitrile	1.409	1.291	1.144	1.215	1.393	1.317	1.461	1.405	1.317	1.328	7.64
17)	T	1,1-Dichloroet...	1.397	1.391	1.297	1.107	1.202	1.095	1.187	1.151	1.088	1.213	10.01
18)	T	2-Methyl-2-Pro...	3.444	3.173	2.894	2.713	2.904	2.555	2.885	2.612	2.023	2.800	14.33
19)	T	Methylene Chlo...			1.917	1.510	1.345	1.085	1.169	1.129	1.082	1.320	23.24
20)	T	3-Chloro-1-pro...	1.632	1.640	1.407	1.296	1.426	1.309	1.453	1.405	1.337	1.434	8.81
21)	T	Trichlorotrifl...	1.454	1.362	1.169	0.945	1.117	0.981	1.051	1.045	1.013	1.126	15.49
22)	T	Carbon Disulfide	5.049	4.757	4.065	3.896	4.127	3.800	4.156	4.013	3.804	4.185	10.34
23)	T	trans-1,2-Dich...	1.741	1.704	1.538	1.516	1.613	1.468	1.609	1.555	1.500	1.583	5.84
24)	T	1,1-Dichloroet...	2.510	2.282	2.066	1.934	2.037	1.874	2.018	1.917	1.807	2.049	10.74
25)	T	Methyl tert-Bu...	4.188	4.051	3.403	3.403	3.560	3.230	3.522	3.374	3.077	3.534	10.28
26)	T	Vinyl Acetate	0.297	0.251	0.235	0.253	0.276	0.263	0.299	0.286	0.266	0.270	8.11
27)	T	2-Butanone (MEK)	0.829	0.745	0.747	0.703	0.766	0.708	0.797	0.769	0.751	0.757	5.25
28)	T	cis-1,2-Dichlo...	2.197	2.111	1.628	1.523	1.532	1.390	1.527	1.462	1.398	1.641	18.32
29)	T	Diisopropyl Ether	1.345	1.416	1.201	1.203	1.266	0.928	1.015	0.968	0.912	1.139	16.53
30)	T	Ethyl Acetate	0.488	0.461	0.364	0.393	0.427	0.387	0.421	0.395	0.354	0.410	10.70
31)	T	n-Hexane	2.259	2.213	1.938	1.855	1.964	1.734	1.847	1.709	1.525	1.894	12.40
32)	T	Chloroform	2.560	2.323	2.084	1.884	2.012	1.789	1.969	1.905	1.852	2.042	12.23
33)	S	1,2-Dichloroet...	1.382	1.381	1.376	1.388	1.389	1.381	1.356	1.369	1.383	1.378	0.75
34)	T	Tetrahydrofura...	1.056	0.862	0.719	0.763	0.793	0.712	0.782	0.749	0.727	0.796	13.55
35)	T	Ethyl tert-But...	1.926	1.595	1.429	1.407	1.521	1.383	1.489	1.449	1.411	1.512	11.16
36)	T	1,2-Dichloroet...	1.738	1.622	1.351	1.412	1.457	1.288	1.399	1.361	1.322	1.439	10.30
37)	IR	1,4-Difluorobenzen...	----------	ISTD	----------								
38)	T	1,1,1-Trichlor...	0.458	0.394	0.351	0.360	0.369	0.335	0.365	0.353	0.338	0.369	10.19
39)	T	Isopropyl Acetate	0.144	0.136	0.124	0.125	0.134	0.123	0.134	0.125	0.115	0.129	6.77
40)	T	1-Butanol	0.203	0.217	0.189	0.185	0.212	0.203	0.232	0.219	0.205	0.207	7.09
41)	T	Benzene	1.395	1.472	1.121	0.917	0.975	0.855	0.925	0.885	0.846	1.043	22.68
42)	T	Carbon Tetrach...	0.365	0.367	0.304	0.289	0.309	0.279	0.308	0.299	0.289	0.312	10.30

1/12/15

Method Path : I:\MS09\Methods\
Method File : R9010915.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

43)	T	Cyclohexane	0.453	0.434	0.377	0.358	0.381	0.344	0.373	0.356	0.336	0.379	10.47
44)	T	tert-Amyl Meth...	0.774	0.743	0.671	0.657	0.687	0.627	0.682	0.658	0.598	0.677	7.98
45)	T	1,2-Dichloropr...	0.277	0.271	0.234	0.219	0.232	0.208	0.228	0.217	0.195	0.231	11.72
46)	T	Bromodichlorom...	0.360	0.367	0.306	0.297	0.322	0.292	0.319	0.307	0.280	0.317	9.38
47)	T	Trichloroethene	0.385	0.346	0.307	0.279	0.295	0.259	0.290	0.277	0.254	0.299	14.13
48)	T	1,4-Dioxane	0.217	0.202	0.190	0.187	0.209	0.190	0.211	0.201	0.182	0.199	6.07
49)	T	2,2,4-Trimethy...	1.174	1.112	0.994	0.915	0.977	0.876	0.947	0.895	0.790	0.964	12.32
50)	T	Methyl Methacr...	0.111	0.091	0.097	0.096	0.105	0.098	0.110	0.106	0.096	0.101	7.00
51)	T	n-Heptane	0.295	0.257	0.236	0.227	0.241	0.215	0.237	0.226	0.202	0.237	11.26
52)	T	cis-1,3-Dichlo...	0.414	0.379	0.333	0.331	0.364	0.345	0.384	0.372	0.332	0.362	7.92
53)	T	4-Methyl-2-pen...	0.201	0.188	0.181	0.181	0.205	0.189	0.211	0.203	0.178	0.193	6.35
54)	T	trans-1,3-Dich...	0.283	0.312	0.298	0.287	0.319	0.310	0.347	0.345	0.306	0.312	7.25
55)	T	1,1,2-Trichlor...	0.265	0.291	0.237	0.233	0.253	0.223	0.248	0.242	0.213	0.245	9.44
56)	IR	Chlorobenzene-d5 (...	----------ISTD----------										
57)	S	Toluene-d8 (SS2)	2.606	2.589	2.570	2.577	2.558	2.581	2.563	2.569	2.564	2.575	0.59
58)	T	Toluene	3.585	3.287	2.892	2.684	2.862	2.593	2.820	2.716	2.612	2.894	11.49
59)	T	2-Hexanone	1.196	1.118	1.088	1.079	1.226	1.148	1.276	1.224	1.159	1.168	5.74
60)	T	Dibromochlorom...	0.893	0.848	0.733	0.744	0.782	0.726	0.819	0.798	0.779	0.791	6.99
61)	T	1,2-Dibromoethane	0.882	0.824	0.723	0.681	0.740	0.693	0.770	0.747	0.724	0.754	8.48
62)	T	n-Butyl Acetate	1.331	1.272	1.115	1.120	1.262	1.225	1.352	1.294	1.225	1.244	6.69
63)	T	n-Octane	0.593	0.615	0.524	0.489	0.532	0.490	0.535	0.510	0.484	0.530	8.67
64)	T	Tetrachloroethene	1.146	1.049	0.948	0.858	0.932	0.851	0.931	0.906	0.885	0.945	10.12
65)	T	Chlorobenzene	2.365	2.160	1.955	1.812	1.963	1.760	1.914	1.859	1.792	1.953	10.00
66)	T	Ethylbenzene	3.859	3.615	3.015	2.966	3.219	2.897	3.167	3.054	2.920	3.190	10.44
67)	T	m- p- ylenes	3.066	2.887	2.478	2.375	2.596	2.346	2.567	2.489	2.394	2.577	9.52
68)	T	Bromoform	0.716	0.686	0.621	0.600	0.665	0.628	0.724	0.717	0.712	0.674	7.07
69)	T	Styrene	2.251	2.210	1.929	1.823	2.019	1.882	2.093	2.027	1.956	2.021	7.10
70)	T	o- ylene	3.095	2.968	2.605	2.424	2.619	2.405	2.637	2.558	2.486	2.644	8.95
71)	T	n-Nonane	1.399	1.361	1.089	1.131	1.186	1.077	1.163	1.102	1.022	1.170	11.00
72)	T	1,1,2,2-Tetrac...	1.369	1.267	1.135	1.087	1.190	1.113	1.230	1.182	1.136	1.190	7.40
73)	S	Bromofluoroben...	0.951	0.958	0.954	0.969	0.957	0.973	0.976	0.977	0.972	0.965	1.02
74)	T	Cumene	4.246	3.891	3.352	3.271	3.485	3.160	3.467	3.336	3.214	3.492	10.17
75)	T	alpha-Pinene	1.950	1.886	1.604	1.552	1.666	1.553	1.674	1.623	1.570	1.675	8.68
76)	T	n-Propylbenzene	4.953	4.609	3.872	3.710	4.128	3.766	4.099	3.932	3.759	4.092	10.39
77)	T	3-Ethyltoluene	3.768	3.843	3.179	3.047	3.349	3.100	3.300	3.300	3.226	3.346	8.33
78)	T	4-Ethyltoluene	3.898	3.375	3.183	2.976	3.261	2.980	3.371	3.170	3.013	3.248	8.88
79)	T	1,3,5-Trimethy...	3.418	3.164	2.761	2.637	2.806	2.604	2.865	2.780	2.704	2.860	9.27
80)	T	alpha-Methylst...	1.712	1.604	1.377	1.409	1.554	1.470	1.641	1.595	1.554	1.546	7.07
81)	T	2-Ethyltoluene	3.838	3.698	3.133	3.041	3.292	2.992	3.286	3.193	3.085	3.284	8.96
82)	T	1,2,4-Trimethy...	3.279	3.031	2.695	2.549	2.804	2.595	2.866	2.769	2.663	2.806	8.19
83)	T	n-Decane	1.586	1.562	1.283	1.224	1.343	1.235	1.338	1.252	1.141	1.329	11.41
84)	T	Benzyl Chloride	2.139	1.986	1.830	1.858	2.057	2.116	2.459	2.420	2.356	2.136	10.90
85)	T	1,3-Dichlorobe...	1.980	1.899	1.679	1.590	1.690	1.564	1.742	1.712	1.678	1.726	7.81
86)	T	1,4-Dichlorobe...	2.280	2.098	1.802	1.717	1.806	1.669	1.844	1.816	1.770	1.867	10.48
87)	T	sec-Butylbenzene	4.271	4.169	3.591	3.385	3.718	3.416	3.763	3.638	3.478	3.714	8.48
88)	T	4-Isopropyltol...	4.172	3.947	3.424	3.269	3.548	3.299	3.637	3.431	3.288	3.557	8.85
89)	T	1,2,3-Trimethy...	3.405	3.185	2.808	2.784	2.965	2.750	3.037	2.905	2.824	2.963	7.30
90)	T	1,2-Dichlorobe...	2.111	1.952	1.631	1.530	1.675	1.536	1.704	1.621	1.611	1.708	11.48
91)	T	d-Limonene	1.028	1.048	0.900	0.917	0.973	0.930	1.041	0.982	0.939	0.973	5.72
92)	T	1,2-Dibromo-3-...	0.600	0.572	0.506	0.514	0.582	0.560	0.642	0.616	0.618	0.579	8.04
93)	T	n-Undecane	1.625	1.486	1.343	1.279	1.417	1.316	1.438	1.334	1.254	1.388	8.42
94)	T	1,2,4-Trichlor...	1.529	1.441	1.226	1.207	1.288	1.228	1.347	1.306	1.284	1.317	8.12

Method Path : I:\MS09\Methods\
Method File : R9010915.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

95)	T	Naphthalene	4.581	4.265	3.781	3.732	4.118	3.917	4.296	4.167	3.942	4.089	6.68
96)	T	n-Dodecane	1.500	1.368	1.244	1.208	1.324	1.250	1.367	1.295	1.191	1.305	7.44
97)	T	Hexachlorobuta...	0.932	0.953	0.776	0.748	0.800	0.728	0.810	0.796	0.790	0.815	9.46
98)	T	Cyclohexanone	0.853	0.870	0.690	0.699	0.769	0.730	0.820	0.793	0.762	0.776	8.23
99)	T	tert-Butylbenzene	3.317	3.180	2.773	2.569	2.770	2.572	2.823	2.710	2.599	2.813	9.46
100)	T	n-Butylbenzene	3.213	3.009	2.701	2.635	2.851	2.617	2.899	2.725	2.660	2.812	7.12

(#) = Out of Range

Primary Source Standards Concentrations
(Working & Initial Calibration)

1/28/15

0.2ng/L Std. ID:
1ng/L Std. ID:
4ng/L Std. ID: S29-01081511
20ng/L Std. ID: S29-01081505
200ng/L Std. ID: S29-01081504

Dilution Factors:		5	50	250	1000	5000
	Source Std.	Primary Working Standards				
Compounds	mg/m³	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L
Propene	0.99	198	19.8	3.96	0.99	0.198
Dichlorodifluoromethane	0.95	190	19.0	3.80	0.95	0.190
Chloromethane	1.01	202	20.2	4.04	1.01	0.202
Freon-114	1.02	204	20.4	4.08	1.02	0.204
Vinyl Chloride	1.00	200	20.0	4.00	1.00	0.200
1,3-Butadiene	1.04	208	20.8	4.16	1.04	0.208
Bromomethane	1.02	204	20.4	4.08	1.02	0.204
Chloroethane	1.01	202	20.2	4.04	1.01	0.202
Ethanol	5.16	1032	103.2	20.64	5.16	1.032
Acetonitrile	1.06	212	21.2	4.24	1.06	0.212
Acrolein	1.13	226	22.6	4.52	1.13	0.226
Acetone	5.46	1092	109.2	21.84	5.46	1.092
Trichlorofluoromethane	1.08	216	21.6	4.32	1.08	0.216
Isopropanol	2.14	428	42.8	8.56	2.14	0.428
Acrylonitrile	1.06	212	21.2	4.24	1.06	0.212
1,1-Dichloroethene	1.09	218	21.8	4.36	1.09	0.218
tert-Butanol	2.14	428	42.8	8.56	2.14	0.428
Methylene Chloride	1.13	226	22.6	4.52	1.13	0.226
Allyl Chloride	1.09	218	21.8	4.36	1.09	0.218
Trichlorotrifluoroethane	1.09	218	21.8	4.36	1.09	0.218
Carbon Disulfide	1.05	210	21.0	4.20	1.05	0.210
trans-1,2-Dichloroethene	1.06	212	21.2	4.24	1.06	0.212
1,1-Dichloroethane	1.07	214	21.4	4.28	1.07	0.214
Methyl tert-Butyl Ether	1.09	218	21.8	4.36	1.09	0.218
Vinyl Acetate	5.25	1050	105.0	21.00	5.25	1.050
2-Butanone	1.11	222	22.2	4.44	1.11	0.222
cis-1,2-Dichloroethene	1.10	220	22.0	4.40	1.10	0.220
Diisopropyl Ether	1.10	220	22.0	4.40	1.10	0.220
Ethyl Acetate	2.14	428	42.8	8.56	2.14	0.428
n-Hexane	1.07	214	21.4	4.28	1.07	0.214
Chloroform	1.12	224	22.4	4.48	1.12	0.224
Tetrahydrofuran	1.11	222	22.2	4.44	1.11	0.222
Ethyl tert-Butyl Ether	1.08	216	21.6	4.32	1.08	0.216
1,2-Dichloroethane	1.08	216	21.6	4.32	1.08	0.216
1,1,1-Trichloroethane	1.05	210	21.0	4.20	1.05	0.210
Isopropyl Acetate	2.29	458	45.8	9.16	2.29	0.458
1-Butanol	2.28	456	45.6	9.12	2.28	0.456
Benzene	1.13	226	22.6	4.52	1.13	0.226
Carbon Tetrachloride	1.15	230	23.0	4.60	1.15	0.230
Cyclohexane	2.14	428	42.8	8.56	2.14	0.428
tert-Amyl Methyl Ether	1.07	214	21.4	4.28	1.07	0.214
1,2-Dichloropropane	1.09	218	21.8	4.36	1.09	0.218
Bromodichloromethane	1.09	218	21.8	4.36	1.09	0.218
Trichloroethene	1.08	216	21.6	4.32	1.08	0.216
1,4-Dioxane	1.09	218	21.8	4.36	1.09	0.218
Isooctane	1.07	214	21.4	4.28	1.07	0.214
Methyl Methacrylate	2.14	428	42.8	8.56	2.14	0.428

Working STD Conc.(ng/L):	ICAL Concentrations (Primary Source)												
	0.2	0.2	0.2	0.2	4	4	4	4	20	20	200	200	200
Injection (L):	0.025	0.050	0.100	0.250	0.020	0.025	0.050	0.100	0.050	0.25	0.125	0.25	0.50
ICAL Points:	0.005ng	0.01ng	0.02ng	0.05ng	0.08ng	0.1ng	0.2ng	0.4ng	1ng	5ng	25ng	50ng	100ng
	0.00495	0.0099	0.0198	0.0495	0.0792	0.099	0.198	0.396	0.99	4.95	24.75	49.5	99
	0.00475	0.0095	0.0190	0.0475	0.0760	0.095	0.190	0.380	0.95	4.75	23.75	47.5	95
	0.00505	0.0101	0.0202	0.0505	0.0808	0.101	0.202	0.404	1.01	5.05	25.25	50.5	101
	0.00510	0.0102	0.0204	0.0510	0.0816	0.102	0.204	0.408	1.02	5.10	25.50	51.0	102
	0.00500	0.0100	0.0200	0.0500	0.0800	0.100	0.200	0.400	1.00	5.00	25.00	50.0	100
	0.00520	0.0104	0.0208	0.0520	0.0832	0.104	0.208	0.416	1.04	5.20	26.00	52.0	104
	0.00510	0.0102	0.0204	0.0510	0.0816	0.102	0.204	0.408	1.02	5.10	25.50	51.0	102
	0.00505	0.0101	0.0202	0.0505	0.0808	0.101	0.202	0.404	1.01	5.05	25.25	50.5	101
	0.02580	0.0516	0.1032	0.2580	0.4128	0.516	1.032	2.064	5.16	25.80	129.00	258.0	516
	0.00530	0.0106	0.0212	0.0530	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
	0.00565	0.0113	0.0226	0.0565	0.0904	0.113	0.226	0.452	1.13	5.65	28.25	56.5	113
	0.02730	0.0546	0.1092	0.2730	0.4368	0.546	1.092	2.184	5.46	27.30	136.50	273.0	546
	0.00540	0.0108	0.0216	0.0540	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
	0.01070	0.0214	0.0428	0.1070	0.1712	0.214	0.428	0.856	2.14	10.70	53.50	107.0	214
	0.00530	0.0106	0.0212	0.0530	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
	0.00545	0.0109	0.0218	0.0545	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
	0.01070	0.0214	0.0428	0.1070	0.1712	0.214	0.428	0.856	2.14	10.70	53.50	107.0	214
	0.00565	0.0113	0.0226	0.0565	0.0904	0.113	0.226	0.452	1.13	5.65	28.25	56.5	113
	0.00545	0.0109	0.0218	0.0545	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
	0.00545	0.0109	0.0218	0.0545	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
	0.00525	0.0105	0.0210	0.0525	0.0840	0.105	0.210	0.420	1.05	5.25	26.25	52.5	105
	0.00530	0.0106	0.0212	0.0530	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
	0.00535	0.0107	0.0214	0.0535	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
	0.00545	0.0109	0.0218	0.0545	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
	0.02625	0.0525	0.1050	0.2625	0.4200	0.525	1.050	2.100	5.25	26.25	131.25	262.5	525
	0.00555	0.0111	0.0222	0.0555	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
	0.00550	0.0110	0.0220	0.0550	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
	0.00550	0.0110	0.0220	0.0550	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
	0.01070	0.0214	0.0428	0.1070	0.1712	0.214	0.428	0.856	2.14	10.70	53.50	107.0	214
	0.00535	0.0107	0.0214	0.0535	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
	0.00560	0.0112	0.0224	0.0560	0.0896	0.112	0.224	0.448	1.12	5.60	28.00	56.0	112
	0.00555	0.0111	0.0222	0.0555	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
	0.00540	0.0108	0.0216	0.0540	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
	0.00540	0.0108	0.0216	0.0540	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
	0.00525	0.0105	0.0210	0.0525	0.0840	0.105	0.210	0.420	1.05	5.25	26.25	52.5	105
	0.01145	0.0229	0.0458	0.1145	0.1832	0.229	0.458	0.916	2.29	11.45	57.25	114.5	229
	0.01140	0.0228	0.0456	0.1140	0.1824	0.228	0.456	0.912	2.28	11.40	57.00	114.0	228
	0.00565	0.0113	0.0226	0.0565	0.0904	0.113	0.226	0.452	1.13	5.65	28.25	56.5	113
	0.00575	0.0115	0.0230	0.0575	0.0920	0.115	0.230	0.460	1.15	5.75	28.75	57.5	115
	0.01070	0.0214	0.0428	0.1070	0.1712	0.214	0.428	0.856	2.14	10.70	53.50	107.0	214
	0.00535	0.0107	0.0214	0.0535	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
	0.00545	0.0109	0.0218	0.0545	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
	0.00545	0.0109	0.0218	0.0545	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
	0.00540	0.0108	0.0216	0.0540	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
	0.00545	0.0109	0.0218	0.0545	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
	0.00535	0.0107	0.0214	0.0535	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
	0.01070	0.0214	0.0428	0.1070	0.1712	0.214	0.428	0.856	2.14	10.70	53.50	107.0	214

Primary Source Standards Concentrations
(Working & Initial Calibration)

0.2ng/L Std. ID:
1ng/L Std. ID:
4ng/L Std. ID: S29-01081511
20ng/L Std. ID: S29-01081505
200ng/L Std. ID: S29-01081504

Dilution Factors:		5	50	250	1000	5000	Working STD Conc.(ng/L):	ICAL Concentrations (Primary Source)												
	Source Std.	Primary Working Standards					Injection (L):	0.2	0.2	0.2	0.2	4	4	4	4	20	20	200	200	200
								0.025	0.050	0.100	0.250	0.020	0.025	0.050	0.100	0.050	0.25	0.125	0.25	0.50
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L	ICAL Points:	0.005ng	0.01ng	0.02ng	0.05ng	0.08ng	0.1ng	0.2ng	0.4ng	1ng	5ng	25ng	50ng	100ng
n-Heptane	1.09	218	21.8	4.36	1.09	0.218		0.00545	0.0109	0.0218	0.0545	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
cis-1,3-Dichloropropene	1.05	210	21.0	4.20	1.05	0.210		0.00525	0.0105	0.0210	0.0525	0.0840	0.105	0.210	0.420	1.05	5.25	26.25	52.5	105
4-Methyl-2-pentanone	1.11	222	22.2	4.44	1.11	0.222		0.00555	0.0111	0.0222	0.0555	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
trans-1,3-Dichloropropene	1.06	212	21.2	4.24	1.06	0.212		0.00530	0.0106	0.0212	0.0530	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
1,1,2-Trichloroethane	1.09	218	21.8	4.36	1.09	0.218		0.00545	0.0109	0.0218	0.0545	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
Toluene	1.10	220	22.0	4.40	1.10	0.220		0.00550	0.0110	0.0220	0.0550	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
2-Hexanone	1.10	220	22.0	4.40	1.10	0.220		0.00550	0.0110	0.0220	0.0550	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
Dibromochloromethane	1.10	220	22.0	4.40	1.10	0.220		0.00550	0.0110	0.0220	0.0550	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
1,2-Dibromoethane	1.10	220	22.0	4.40	1.10	0.220		0.00550	0.0110	0.0220	0.0550	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
n-Butyl Acetate	1.16	232	23.2	4.64	1.16	0.232		0.00580	0.0116	0.0232	0.0580	0.0928	0.116	0.232	0.464	1.16	5.80	29.00	58.0	116
n-Octane	1.06	212	21.2	4.24	1.06	0.212		0.00530	0.0106	0.0212	0.0530	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
Tetrachloroethene	1.01	202	20.2	4.04	1.01	0.202		0.00505	0.0101	0.0202	0.0505	0.0808	0.101	0.202	0.404	1.01	5.05	25.25	50.5	101
Chlorobenzene	1.11	222	22.2	4.44	1.11	0.222		0.00555	0.0111	0.0222	0.0555	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
Ethylbenzene	1.10	220	22.0	4.40	1.10	0.220		0.00550	0.0110	0.0220	0.0550	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
m-&p-Xylene	2.16	432	43.2	8.64	2.16	0.432		0.01080	0.0216	0.0432	0.1080	0.1728	0.216	0.432	0.864	2.16	10.80	54.00	108.0	216
Bromoform	1.14	228	22.8	4.56	1.14	0.228		0.00570	0.0114	0.0228	0.0570	0.0912	0.114	0.228	0.456	1.14	5.70	28.50	57.0	114
Styrene	1.12	224	22.4	4.48	1.12	0.224		0.00560	0.0112	0.0224	0.0560	0.0896	0.112	0.224	0.448	1.12	5.60	28.00	56.0	112
o-Xylene	1.06	212	21.2	4.24	1.06	0.212		0.00530	0.0106	0.0212	0.0530	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
n-Nonane	1.04	208	20.8	4.16	1.04	0.208		0.00520	0.0104	0.0208	0.0520	0.0832	0.104	0.208	0.416	1.04	5.20	26.00	52.0	104
1,1,2,2-Tetrachloroethane	1.05	210	21.0	4.20	1.05	0.210		0.00525	0.0105	0.0210	0.0525	0.0840	0.105	0.210	0.420	1.05	5.25	26.25	52.5	105
Cumene	1.04	208	20.8	4.16	1.04	0.208		0.00520	0.0104	0.0208	0.0520	0.0832	0.104	0.208	0.416	1.04	5.20	26.00	52.0	104
alpha-Pinene	1.07	214	21.4	4.28	1.07	0.214		0.00535	0.0107	0.0214	0.0535	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
n-Propylbenzene	1.03	206	20.6	4.12	1.03	0.206		0.00515	0.0103	0.0206	0.0515	0.0824	0.103	0.206	0.412	1.03	5.15	25.75	51.5	103
3-Ethyltoluene	1.08	216	21.6	4.32	1.08	0.216		0.00540	0.0108	0.0216	0.0540	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
4-Ethyltoluene	1.08	216	21.6	4.32	1.08	0.216		0.00540	0.0108	0.0216	0.0540	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
1,3,5-Trimethylbenzene	1.07	214	21.4	4.28	1.07	0.214		0.00535	0.0107	0.0214	0.0535	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
alpha-Methylstyrene	1.08	216	21.6	4.32	1.08	0.216		0.00540	0.0108	0.0216	0.0540	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
2-Ethyltoluene	1.08	216	21.6	4.32	1.08	0.216		0.00540	0.0108	0.0216	0.0540	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108
1,2,4-Trimethylbenzene	1.09	218	21.8	4.36	1.09	0.218		0.00545	0.0109	0.0218	0.0545	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
n-Decane	1.06	212	21.2	4.24	1.06	0.212		0.00530	0.0106	0.0212	0.0530	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
Benzyl Chloride	1.14	228	22.8	4.56	1.14	0.228		0.00570	0.0114	0.0228	0.0570	0.0912	0.114	0.228	0.456	1.14	5.70	28.50	57.0	114
1,3-Dichlorobenzene	1.14	228	22.8	4.56	1.14	0.228		0.00570	0.0114	0.0228	0.0570	0.0912	0.114	0.228	0.456	1.14	5.70	28.50	57.0	114
1,4-Dichlorobenzene	1.06	212	21.2	4.24	1.06	0.212		0.00530	0.0106	0.0212	0.0530	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
sec-Butylbenzene	1.09	218	21.8	4.36	1.09	0.218		0.00545	0.0109	0.0218	0.0545	0.0872	0.109	0.218	0.436	1.09	5.45	27.25	54.5	109
p-Isopropyltoluene	1.07	214	21.4	4.28	1.07	0.214		0.00535	0.0107	0.0214	0.0535	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
1,2,3-Trimethylbenzene	1.06	212	21.2	4.24	1.06	0.212		0.00530	0.0106	0.0212	0.0530	0.0848	0.106	0.212	0.424	1.06	5.30	26.50	53.0	106
1,2-Dichlorobenzene	1.11	222	22.2	4.44	1.11	0.222		0.00555	0.0111	0.0222	0.0555	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
d-Limonene	1.07	214	21.4	4.28	1.07	0.214		0.00535	0.0107	0.0214	0.0535	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
1,2-Dibromo-3-chloropropane	1.10	220	22.0	4.40	1.10	0.220		0.00550	0.0110	0.0220	0.0550	0.0880	0.110	0.220	0.440	1.10	5.50	27.50	55.0	110
n-Undecane	1.04	208	20.8	4.16	1.04	0.208		0.00520	0.0104	0.0208	0.0520	0.0832	0.104	0.208	0.416	1.04	5.20	26.00	52.0	104
1,2,4-Trichlorobenzene	1.13	226	22.6	4.52	1.13	0.226		0.00565	0.0113	0.0226	0.0565	0.0904	0.113	0.226	0.452	1.13	5.65	28.25	56.5	113
Naphthalene	1.11	222	22.2	4.44	1.11	0.222		0.00555	0.0111	0.0222	0.0555	0.0888	0.111	0.222	0.444	1.11	5.55	27.75	55.5	111
n-Dodecane	1.13	226	22.6	4.52	1.13	0.226		0.00565	0.0113	0.0226	0.0565	0.0904	0.113	0.226	0.452	1.13	5.65	28.25	56.5	113
Hexachloro-1,3-butadiene	1.12	224	22.4	4.48	1.12	0.224		0.00560	0.0112	0.0224	0.0560	0.0896	0.112	0.224	0.448	1.12	5.60	28.00	56.0	112
Methacrylonitrile	1.07	214	21.4	4.28	1.07	0.214		0.00535	0.0107	0.0214	0.0535	0.0856	0.107	0.214	0.428	1.07	5.35	26.75	53.5	107
Cyclohexanone	1.18	236	23.6	4.72	1.18	0.236		0.00590	0.0118	0.0236	0.0590	0.0944	0.118	0.236	0.472	1.18	5.90	29.50	59.0	118
tert-Butylbenzene	1.08	216	21.6	4.32	1.08	0.216		0.00540	0.0108	0.0216	0.0540	0.0864	0.108	0.216	0.432	1.08	5.40	27.00	54.0	108

Primary Source Standards Concentrations
(Working & Initial Calibration)

0.2ng/L Std. ID:
1ng/L Std. ID:
4ng/L Std. ID: S29-01081511
20ng/L Std. ID: S29-01081505
200ng/L Std. ID: S29-01081504

Dilution Factors:		5	50	250	1000	5000	Working STD Conc.(ng/L):	ICAL Concentrations (Primary Source)												
								0.2	0.2	0.2	0.2	4	4	4	4	20	20	200	200	200
	Source Std.	Primary Working Standards					Injection (L):	0.025	0.050	0.100	0.250	0.020	0.025	0.050	0.100	0.050	0.25	0.125	0.25	0.50
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	0.2ng/L	ICAL Points:	0.005ng	0.01ng	0.02ng	0.05ng	0.08ng	0.1ng	0.2ng	0.4ng	1ng	5ng	25ng	50ng	100ng
n-Butylbenzene	1.12	224	22.4	4.48	1.12	0.224		0.00560	0.0112	0.0224	0.0560	0.0896	0.112	0.224	0.448	1.12	5.60	28.00	56.0	112

Calibration Status Report MS09

Method : I:\MS09\Methods\R9010915.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Mon Jan 12 09:19:02 2015
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.08	0	13	I:\MS09\Data\2015_01\09\01091513.D
2	0.10	0	13	I:\MS09\Data\2015_01\09\01091514.D
3	0.20	0	13	I:\MS09\Data\2015_01\09\01091515.D
4	0.40	0	13	I:\MS09\Data\2015_01\09\01091516.D
5	1.0	1	13	I:\MS09\Data\2015_01\09\01091517.D
6	5.0	5	13	I:\MS09\Data\2015_01\09\01091518.D
7	25	25	13	I:\MS09\Data\2015_01\09\01091519.D
8	50	50	13	I:\MS09\Data\2015_01\09\01091520.D
9	100	99	13	I:\MS09\Data\2015_01\09\01091521.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.08	Jan 12 09:16 2015	Jan 12 09:08 2015	9 Jan 2015 17:48
2	0.10	Jan 12 09:16 2015	Jan 12 09:07 2015	9 Jan 2015 18:21
3	0.20	Jan 12 09:16 2015	Jan 12 09:05 2015	9 Jan 2015 18:55
4	0.40	Jan 12 09:17 2015	Jan 12 09:04 2015	9 Jan 2015 19:29
5	1.0	Jan 12 09:17 2015	Jan 12 09:03 2015	9 Jan 2015 20:02
6	5.0	Jan 12 09:18 2015	Jan 12 09:00 2015	9 Jan 2015 20:36
7	25	Jan 12 09:18 2015	Jan 12 08:57 2015	9 Jan 2015 21:10
8	50	Jan 12 09:18 2015	Jan 12 09:11 2015	9 Jan 2015 21:43
9	100	Jan 12 09:19 2015	Jan 12 09:12 2015	9 Jan 2015 22:17

R9010915.M Wed Jan 28 12:00:20 2015 1/28/15

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091513.D
Acq On : 9 an 2015 17:48 Operator: SC
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:08:38 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	175791	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.00	114	896316	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	324824	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	242916	11.343	ng		-0.02
Spiked Amount 12.500			Recovery = 90.72%				
57) Toluene-d8 (SS2)	13.44	98	846633	13.060	ng		0.00
Spiked Amount 12.500			Recovery = 104.48%				
73) Bromofluorobenzene (SS3)	16.96	174	309033	14.524	ng		0.00
Spiked Amount 12.500			Recovery = 116.16%				
Target Compounds							Qvalue
2) Propene	3.83	42	1344	0.071	ng	#	83
3) Dichlorodifluoromethan...	3.93	85	3190	0.090	ng		99
4) Chloromethane	4.13	50	2282	0.081	ng		98
5) 1,2-Dichloro-1,1,2,2-t...	4.28	135	2000	0.106	ng		98
6) Vinyl Chloride	4.40	62	2427	0.086	ng		94
7) 1,3-Butadiene	4.57	54	1488	0.094	ng		96
8) Bromomethane	4.86	94	1692	0.096	ng		97
9) Chloroethane	5.08	64	1116	0.079	ng		100
10) Ethanol	5.25	45	5558	0.436	ng		98
11) Acetonitrile	5.48	41	2619	0.079	ng	#	58
12) Acrolein	5.64	56	986	0.101	ng		95
13) Acetone	5.77	58	6749	0.504	ng		96
14) Trichlorofluoromethane	5.94	101	2907	0.104	ng		99
15) 2-Propanol (Isopropanol)	6.08	45	7354	0.173	ng		99
16) Acrylonitrile	6.27	53	1680	0.077	ng		98
17) 1,1-Dichloroethene	6.62	96	1713	0.103	ng		95
18) 2-Methyl-2-Propanol (t...	6.75	59	8291	0.196	ng		93
19) Methylene Chloride	6.76	84	4196	0.239	ng		98
20) 3-Chloro-1-propene (Al...	6.89	41	2001	0.081	ng		88
21) Trichlorotrifluoroethane	7.08	151	1783	0.118	ng		93
22) Carbon Disulfide	7.05	76	5964	0.095	ng		98
23) trans-1,2-Dichloroethene	7.78	61	2076	0.089	ng		98
24) 1,1-Dichloroethane	7.99	63	3021	0.095	ng		99
25) Methyl tert-Butyl Ether	8.12	73	5136	0.105	ng		93
26) Vinyl Acetate	8.18	86	1753	0.419	ng		97
27) 2-Butanone (MEK)	8.46	72	1035	0.088	ng	#	84
28) cis-1,2-Dichloroethene	8.86	61	2719	0.119	ng		89
29) Diisopropyl Ether	9.14	87	1665	0.110	ng	#	83
30) Ethyl Acetate	9.14	61	1175	0.191	ng		86
31) n-Hexane	9.12	57	2719	0.093	ng	#	95
32) Chloroform	9.17	83	3226	0.109	ng		98
34) Tetrahydrofuran (THF)	9.62	72	1319	0.116	ng		98
35) Ethyl tert-Butyl Ether	9.69	87	2340	0.122	ng	#	86
36) 1,2-Dichloroethane	9.92	62	2112	0.102	ng		95
38) 1,1,1-Trichloroethane	10.18	97	2759	0.108	ng		98
39) Isopropyl Acetate	10.57	61	1897	0.191	ng		94
40) 1-Butanol	10.62	56	2652	0.156	ng		80
41) Benzene	10.64	78	9040	0.129	ng		99
42) Carbon Tetrachloride	10.80	117	2406	0.115	ng		98
43) Cyclohexane	10.93	84	5556	0.213	ng		97
44) tert-Amyl Methyl Ether	11.28	73	4749	0.101	ng		98
45) 1,2-Dichloropropane	11.46	63	1729	0.095	ng		96
46) Bromodichloromethane	11.65	83	2251	0.098	ng		99
47) Trichloroethene	11.70	130	2385	0.130	ng		97
48) 1,4-Dioxane	11.72	88	1354	0.088	ng	#	64
49) 2,2,4-Trimethylpentane...	11.77	57	7209	0.096	ng		95

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091513.D
Acq On : 9 an 2015 17:48 Operator: SC
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

Quant Time: an 12 09:08:38 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

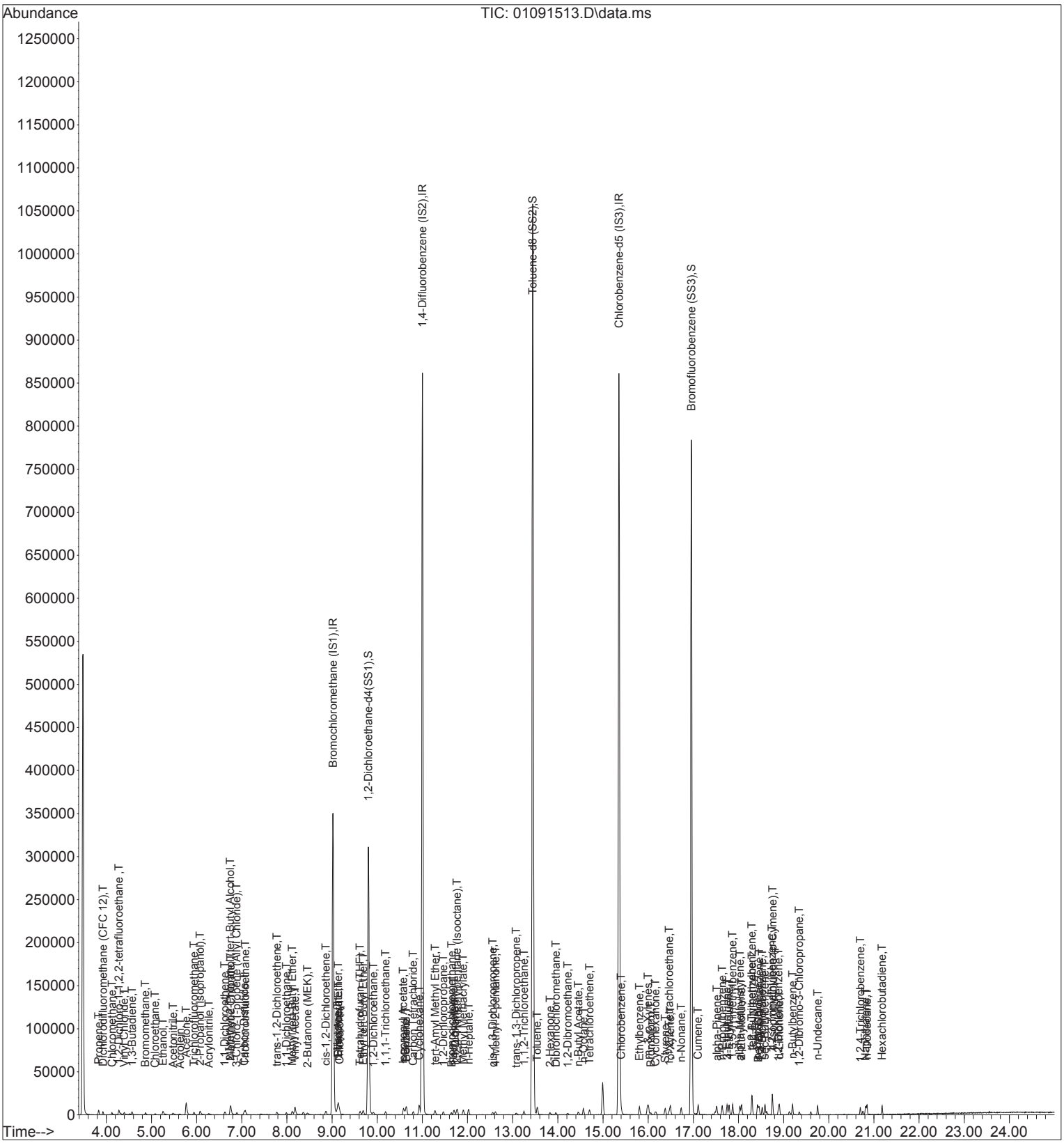
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
50) Methyl Methacrylate	11.90	100	1368	0.197 ng	95
51) n-Heptane	12.03	71	1842	0.110 ng	92
52) cis-1,3-Dichloropropene	12.56	75	2491	0.097 ng	92
53) 4-Methyl-2-pentanone	12.62	58	1282	0.082 ng	88
54) trans-1,3-Dichloropropene	13.08	75	1721	0.072 ng	96
55) 1,1,2-Trichloroethane	13.25	97	1657	0.097 ng	85
58) Toluene	13.54	91	8197	0.119 ng	99
59) 2-Hexanone	13.83	43	2734	0.080 ng	92
60) Dibromochloromethane	13.96	129	2042	0.113 ng	92
61) 1,2-Dibromoethane	14.22	107	2016	0.115 ng	92
62) n-Butyl Acetate	14.45	43	3210	0.094 ng	92
63) n-Octane	14.57	57	1306	0.095 ng	95
64) Tetrachloroethene	14.70	166	2406	0.120 ng	94
65) Chlorobenzene	15.40	112	5457	0.120 ng	99
66) Ethylbenzene	15.81	91	8824	0.119 ng	98
67) m- p- ylenes	16.00	91	13768	0.236 ng	98
68) Bromoform	16.06	173	1696	0.112 ng	100
69) Styrene	16.38	104	5241	0.115 ng	97
70) o- ylene	16.49	91	6821	0.114 ng	97
71) n-Nonane	16.73	43	3024	0.095 ng	100
72) 1,1,2,2-Tetrachloroethane	16.46	83	2989	0.096 ng	93
74) Cumene	17.11	105	9181	0.119 ng	99
75) alpha-Pinene	17.52	93	4338	0.115 ng	80
76) n-Propylbenzene	17.64	91	10605	0.112 ng	97
77) 3-Ethyltoluene	17.75	105	8460	0.115 ng	98
78) 4-Ethyltoluene	17.80	105	8752	0.121 ng	96
79) 1,3,5-Trimethylbenzene	17.87	105	7603	0.123 ng	97
80) alpha-Methylstyrene	18.03	118	3843	0.117 ng	86
81) 2-Ethyltoluene	18.06	105	8616	0.120 ng	100
82) 1,2,4-Trimethylbenzene	18.30	105	7429	0.124 ng	99
83) n-Decane	18.42	57	3494	0.106 ng	94
84) Benzyl Chloride	18.44	91	5070	0.096 ng	93
85) 1,3-Dichlorobenzene	18.46	146	4692	0.130 ng	96
86) 1,4-Dichlorobenzene	18.53	146	5024	0.131 ng	99
87) sec-Butylbenzene	18.58	105	9678	0.120 ng	99
88) 4-Isopropyltoluene (p-...	18.76	119	9280	0.127 ng	97
89) 1,2,3-Trimethylbenzene	18.74	105	7504	0.119 ng	96
90) 1,2-Dichlorobenzene	18.88	146	4872	0.138 ng	94
91) d-Limonene	18.91	68	2287	0.093 ng	97
92) 1,2-Dibromo-3-Chloropr...	19.34	157	1371	0.104 ng	89
93) n-Undecane	19.75	57	3514	0.100 ng	95
94) 1,2,4-Trichlorobenzene	20.70	180	3591	0.141 ng	96
95) Naphthalene	20.81	128	10571	0.129 ng	95
96) n-Dodecane	20.85	57	3524	0.108 ng	94
97) Hexachlorobutadiene	21.18	225	2170	0.142 ng	96
98) Cyclohexanone	16.16	55	2093	0.099 ng	96
99) tert-Butylbenzene	18.30	119	7448	0.126 ng	99
100) n-Butylbenzene	19.20	91	7481	0.119 ng	96

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091513.D
Acq On : 9 an 2015 17:48 Operator: SC
Sample : 0.08ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

Quant Time: an 12 09:08:38 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091514.D
Acq On : 9 an 2015 18:21 Operator: SC
Sample : 0.10ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:07:22 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	177884	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	11.00	114	903599	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	330436	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	245574	11.332	ng		-0.02
Spiked Amount 12.500			Recovery = 90.64%				
57) Toluene-d8 (SS2)	13.44	98	855371	12.971	ng		0.00
Spiked Amount 12.500			Recovery = 103.76%				
73) Bromofluorobenzene (SS3)	16.96	174	316668	14.630	ng		0.00
Spiked Amount 12.500			Recovery = 117.04%				
Target Compounds							Qvalue
2) Propene	3.83	42	1728	0.090	ng		93
3) Dichlorodifluoromethan...	3.92	85	3717	0.103	ng		99
4) Chloromethane	4.11	50	2790	0.098	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.28	135	2493	0.130	ng		95
6) Vinyl Chloride	4.39	62	2926	0.102	ng		99
7) 1,3-Butadiene	4.57	54	1943	0.121	ng		95
8) Bromomethane	4.86	94	2084	0.116	ng		96
9) Chloroethane	5.08	64	1392	0.098	ng		95
10) Ethanol	5.25	45	6486	0.503	ng		97
11) Acetonitrile	5.47	41	3092	0.092	ng	#	38
12) Acrolein	5.62	56	1026	0.104	ng		98
13) Acetone	5.76	58	7790	0.575	ng		93
14) Trichlorofluoromethane	5.94	101	3449	0.122	ng		96
15) 2-Propanol (Isopropanol)	6.07	45	8589	0.199	ng		96
16) Acrylonitrile	6.26	53	1948	0.089	ng		94
17) 1,1-Dichloroethene	6.62	96	2157	0.128	ng		95
18) 2-Methyl-2-Propanol (t...	6.75	59	9662	0.226	ng		98
19) Methylene Chloride	6.75	84	4604	0.259	ng		100
20) 3-Chloro-1-propene (Al...	6.89	41	2544	0.102	ng		90
21) Trichlorotrifluoroethane	7.08	151	2112	0.138	ng		95
22) Carbon Disulfide	7.05	76	7108	0.112	ng		96
23) trans-1,2-Dichloroethene	7.78	61	2570	0.109	ng		93
24) 1,1-Dichloroethane	7.99	63	3475	0.108	ng		97
25) Methyl tert-Butyl Ether	8.12	73	6283	0.127	ng		97
26) Vinyl Acetate	8.18	86	1876	0.444	ng	#	59
27) 2-Butanone (MEK)	8.44	72	1177	0.099	ng	#	77
28) cis-1,2-Dichloroethene	8.86	61	3304	0.143	ng		97
29) Diisopropyl Ether	9.14	87	2217	0.145	ng	#	64
30) Ethyl Acetate	9.13	61	1404	0.226	ng		82
31) n-Hexane	9.12	57	3369	0.114	ng		98
32) Chloroform	9.16	83	3703	0.124	ng		97
34) Tetrahydrofuran (THF)	9.61	72	1361	0.118	ng	#	83
35) Ethyl tert-Butyl Ether	9.68	87	2452	0.126	ng		97
36) 1,2-Dichloroethane	9.92	62	2493	0.119	ng		98
38) 1,1,1-Trichloroethane	10.19	97	2987	0.116	ng		97
39) Isopropyl Acetate	10.58	61	2256	0.226	ng	#	91
40) 1-Butanol	10.61	56	3572	0.209	ng		91
41) Benzene	10.64	78	12026	0.170	ng		98
42) Carbon Tetrachloride	10.80	117	3055	0.145	ng		94
43) Cyclohexane	10.93	84	6718	0.255	ng		99
44) tert-Amyl Methyl Ether	11.28	73	5750	0.121	ng		100
45) 1,2-Dichloropropane	11.46	63	2136	0.116	ng		88
46) Bromodichloromethane	11.64	83	2892	0.125	ng		98
47) Trichloroethene	11.70	130	2700	0.145	ng		88
48) 1,4-Dioxane	11.72	88	1590	0.103	ng		97
49) 2,2,4-Trimethylpentane...	11.77	57	8603	0.114	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091514.D
Acq On : 9 an 2015 18:21 Operator: SC
Sample : 0.10ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

Quant Time: an 12 09:07:22 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

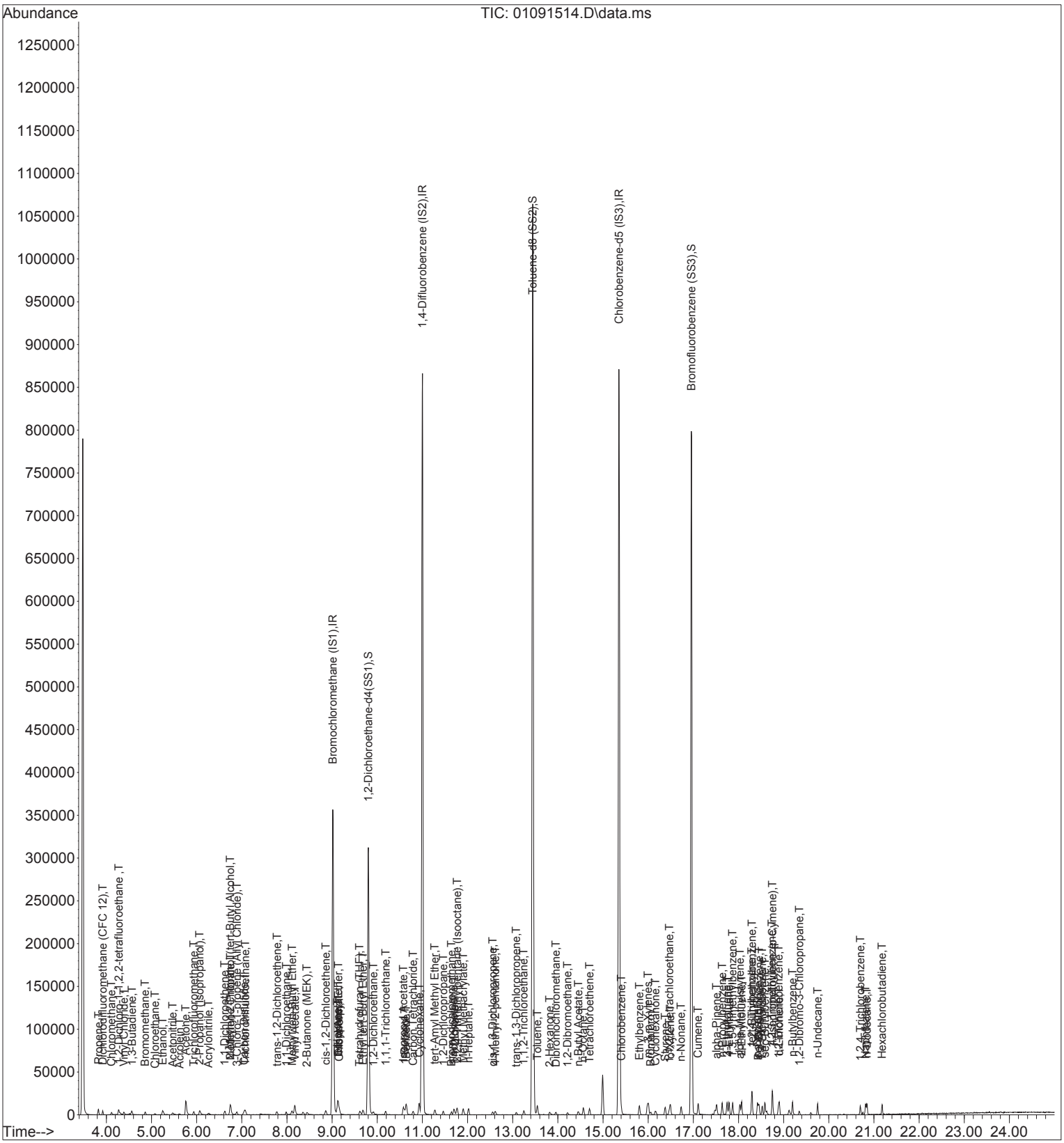
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
50) Methyl Methacrylate	11.91	100	1415	0.202	ng	#	80
51) n-Heptane	12.03	71	2026	0.120	ng		93
52) cis-1,3-Dichloropropene	12.56	75	2878	0.111	ng		96
53) 4-Methyl-2-pentanone	12.61	58	1512	0.095	ng		90
54) trans-1,3-Dichloropropene	13.08	75	2387	0.099	ng		89
55) 1,1,2-Trichloroethane	13.24	97	2294	0.134	ng		92
58) Toluene	13.55	91	9558	0.137	ng		93
59) 2-Hexanone	13.82	43	3250	0.093	ng		93
60) Dibromochloromethane	13.96	129	2467	0.134	ng		99
61) 1,2-Dibromoethane	14.21	107	2397	0.135	ng		91
62) n-Butyl Acetate	14.45	43	3900	0.113	ng		94
63) n-Octane	14.56	57	1723	0.123	ng		90
64) Tetrachloroethene	14.70	166	2801	0.137	ng		99
65) Chlorobenzene	15.41	112	6337	0.137	ng		99
66) Ethylbenzene	15.81	91	10511	0.140	ng		98
67) m- p- ylenes	15.99	91	16487	0.277	ng		100
68) Bromoform	16.05	173	2068	0.134	ng		94
69) Styrene	16.38	104	6544	0.141	ng		98
70) o- ylene	16.49	91	8316	0.136	ng		98
71) n-Nonane	16.73	43	3741	0.115	ng		92
72) 1,1,2,2-Tetrachloroethane	16.47	83	3516	0.111	ng		99
74) Cumene	17.10	105	10698	0.136	ng		97
75) alpha-Pinene	17.51	93	5335	0.139	ng		68
76) n-Propylbenzene	17.64	91	12548	0.131	ng		98
77) 3-Ethyltoluene	17.75	105	10973	0.147	ng		98
78) 4-Ethyltoluene	17.79	105	9636	0.131	ng		93
79) 1,3,5-Trimethylbenzene	17.87	105	8950	0.142	ng		98
80) alpha-Methylstyrene	18.03	118	4580	0.137	ng		96
81) 2-Ethyltoluene	18.07	105	10558	0.144	ng		95
82) 1,2,4-Trimethylbenzene	18.30	105	8733	0.144	ng		98
83) n-Decane	18.42	57	4378	0.131	ng		92
84) Benzyl Chloride	18.44	91	5985	0.111	ng		97
85) 1,3-Dichlorobenzene	18.46	146	5722	0.156	ng		98
86) 1,4-Dichlorobenzene	18.53	146	5879	0.150	ng		97
87) sec-Butylbenzene	18.59	105	12013	0.146	ng		98
88) 4-Isopropyltoluene (p-...	18.75	119	11165	0.150	ng		94
89) 1,2,3-Trimethylbenzene	18.74	105	8924	0.139	ng		96
90) 1,2-Dichlorobenzene	18.89	146	5728	0.160	ng		97
91) d-Limonene	18.90	68	2963	0.118	ng		94
92) 1,2-Dibromo-3-Chloropr...	19.35	157	1663	0.124	ng		98
93) n-Undecane	19.75	57	4085	0.114	ng		97
94) 1,2,4-Trichlorobenzene	20.70	180	4305	0.166	ng		97
95) Naphthalene	20.81	128	12514	0.151	ng		98
96) n-Dodecane	20.84	57	4085	0.124	ng		96
97) Hexachlorobutadiene	21.18	225	2821	0.181	ng		94
98) Cyclohexanone	16.16	55	2714	0.126	ng		96
99) tert-Butylbenzene	18.30	119	9079	0.151	ng		98
100) n-Butylbenzene	19.20	91	8909	0.139	ng		100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091514.D
Acq On : 9 an 2015 18:21 Operator: SC
Sample : 0.10ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

Quant Time: an 12 09:07:22 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091515.D
Acq On : 9 an 2015 18:55 Operator: SC
Sample : 0.20ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:05:53 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	178763	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.00	114	902817	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	332938	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	246003	11.296	ng		-0.02
Spiked Amount 12.500			Recovery = 90.40%				
57) Toluene-d8 (SS2)	13.44	98	855812	12.880	ng		0.00
Spiked Amount 12.500			Recovery = 103.04%				
73) Bromofluorobenzene (SS3)	16.96	174	317779	14.571	ng		0.00
Spiked Amount 12.500			Recovery = 116.56%				
Target Compounds							Qvalue
2) Propene	3.83	42	2993	0.155	ng		98
3) Dichlorodifluoromethan...	3.93	85	6814	0.188	ng		97
4) Chloromethane	4.12	50	4612	0.161	ng		97
5) 1,2-Dichloro-1,1,2,2-t...	4.28	135	4368	0.227	ng		100
6) Vinyl Chloride	4.40	62	4978	0.173	ng		93
7) 1,3-Butadiene	4.57	54	3285	0.204	ng		93
8) Bromomethane	4.86	94	3776	0.210	ng		94
9) Chloroethane	5.08	64	2707	0.189	ng		93
10) Ethanol	5.25	45	11540	0.890	ng		98
11) Acetonitrile	5.47	41	5647	0.167	ng	#	53
12) Acrolein	5.62	56	1851	0.187	ng		98
13) Acetone	5.76	58	13602	0.999	ng		98
14) Trichlorofluoromethane	5.94	101	6122	0.216	ng		98
15) 2-Propanol (Isopropanol)	6.06	45	15758	0.364	ng		95
16) Acrylonitrile	6.26	53	3469	0.157	ng		92
17) 1,1-Dichloroethene	6.63	96	4043	0.239	ng		89
18) 2-Methyl-2-Propanol (t...	6.73	59	17712	0.413	ng		98
19) Methylene Chloride	6.75	84	6195	0.347	ng		100
20) 3-Chloro-1-propene (Al...	6.89	41	4386	0.175	ng		91
21) Trichlorotrifluoroethane	7.09	151	3644	0.237	ng		95
22) Carbon Disulfide	7.05	76	12207	0.192	ng		99
23) trans-1,2-Dichloroethene	7.78	61	4662	0.197	ng		98
24) 1,1-Dichloroethane	7.99	63	6323	0.195	ng		96
25) Methyl tert-Butyl Ether	8.10	73	10610	0.214	ng		100
26) Vinyl Acetate	8.18	86	3525	0.829	ng	#	70
27) 2-Butanone (MEK)	8.43	72	2372	0.199	ng		97
28) cis-1,2-Dichloroethene	8.87	61	5121	0.220	ng		99
29) Diisopropyl Ether	9.13	87	3778	0.245	ng	#	71
30) Ethyl Acetate	9.12	61	2227	0.357	ng		100
31) n-Hexane	9.12	57	5932	0.199	ng		95
32) Chloroform	9.16	83	6677	0.222	ng		99
34) Tetrahydrofuran (THF)	9.60	72	2283	0.197	ng	#	80
35) Ethyl tert-Butyl Ether	9.69	87	4415	0.226	ng		98
36) 1,2-Dichloroethane	9.92	62	4173	0.198	ng		94
38) 1,1,1-Trichloroethane	10.19	97	5329	0.206	ng		97
39) Isopropyl Acetate	10.58	61	4117	0.412	ng		95
40) 1-Butanol	10.61	56	6229	0.365	ng		90
41) Benzene	10.64	78	18295	0.259	ng		99
42) Carbon Tetrachloride	10.80	117	5055	0.241	ng		99
43) Cyclohexane	10.94	84	11656	0.443	ng		99
44) tert-Amyl Methyl Ether	11.27	73	10364	0.218	ng		99
45) 1,2-Dichloropropane	11.46	63	3692	0.201	ng		97
46) Bromodichloromethane	11.64	83	4816	0.208	ng		98
47) Trichloroethene	11.70	130	4794	0.258	ng		100
48) 1,4-Dioxane	11.72	88	2986	0.194	ng	#	61
49) 2,2,4-Trimethylpentane...	11.77	57	15365	0.204	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091515.D
Acq On : 9 an 2015 18:55 Operator: SC
Sample : 0.20ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

Quant Time: an 12 09:05:53 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

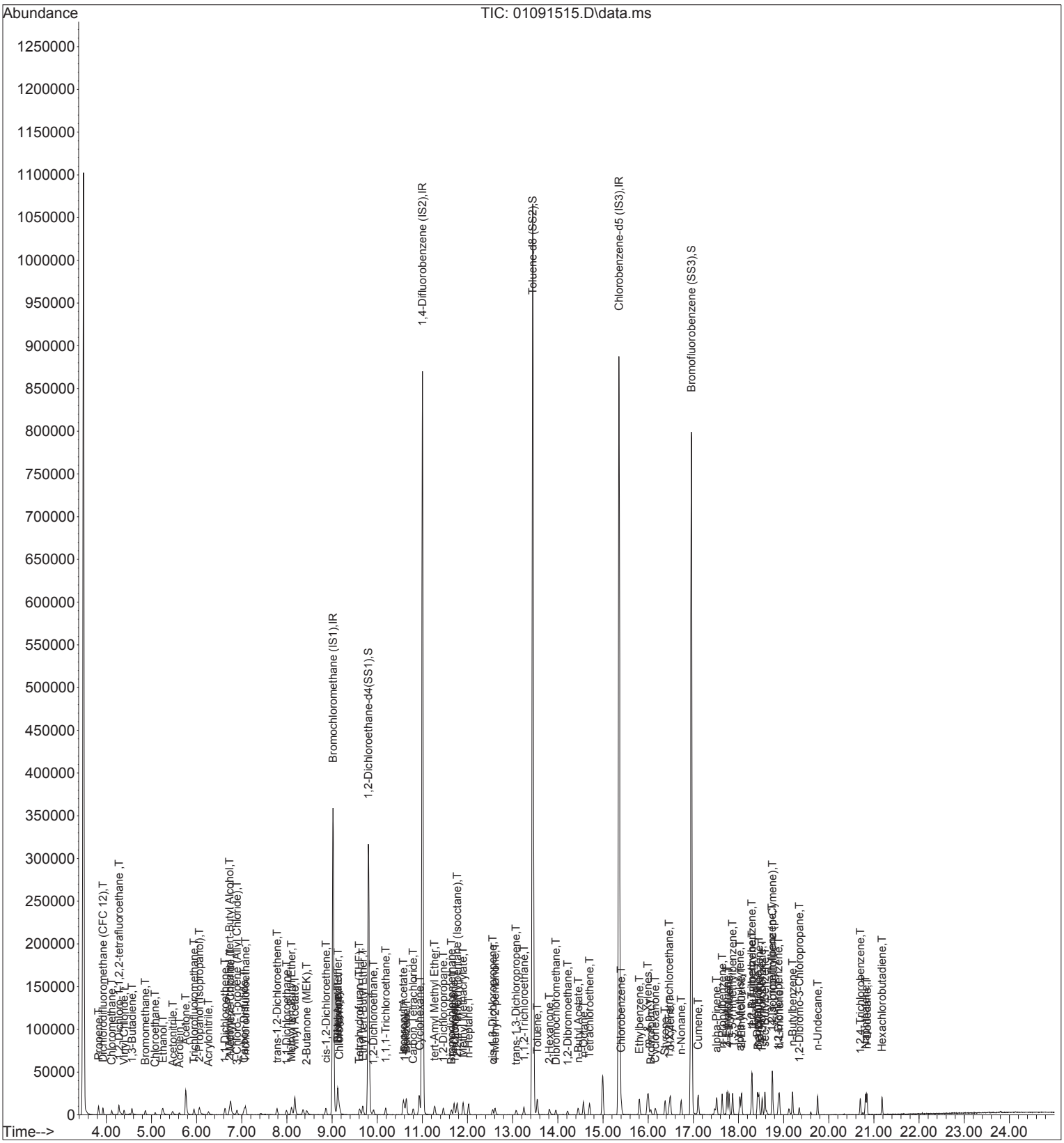
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.90	100	3005	0.429	ng	98
51) n-Heptane	12.03	71	3721	0.220	ng	98
52) cis-1,3-Dichloropropene	12.56	75	5055	0.195	ng	98
53) 4-Methyl-2-pentanone	12.61	58	2897	0.183	ng	92
54) trans-1,3-Dichloropropene	13.07	75	4559	0.190	ng	96
55) 1,1,2-Trichloroethane	13.25	97	3730	0.218	ng	100
58) Toluene	13.55	91	16946	0.240	ng	98
59) 2-Hexanone	13.81	43	6377	0.182	ng	95
60) Dibromochloromethane	13.96	129	4297	0.231	ng	98
61) 1,2-Dibromoethane	14.22	107	4235	0.236	ng	95
62) n-Butyl Acetate	14.45	43	6891	0.198	ng	97
63) n-Octane	14.57	57	2959	0.209	ng	98
64) Tetrachloroethene	14.70	166	5100	0.248	ng	97
65) Chlorobenzene	15.40	112	11562	0.249	ng	98
66) Ethylbenzene	15.81	91	17665	0.233	ng	99
67) m- p- ylenes	15.99	91	28507	0.476	ng	98
68) Bromoform	16.06	173	3769	0.243	ng	98
69) Styrene	16.37	104	11509	0.247	ng	97
70) o- ylene	16.49	91	14707	0.240	ng	98
71) n-Nonane	16.73	43	6031	0.184	ng	98
72) 1,1,2,2-Tetrachloroethane	16.46	83	6348	0.198	ng	99
74) Cumene	17.11	105	18572	0.234	ng	100
75) alpha-Pinene	17.51	93	9144	0.236	ng	78
76) n-Propylbenzene	17.64	91	21243	0.219	ng	99
77) 3-Ethyltoluene	17.75	105	18290	0.243	ng	99
78) 4-Ethyltoluene	17.79	105	18315	0.248	ng	100
79) 1,3,5-Trimethylbenzene	17.87	105	15740	0.249	ng	99
80) alpha-Methylstyrene	18.03	118	7923	0.235	ng	94
81) 2-Ethyltoluene	18.06	105	18024	0.245	ng	99
82) 1,2,4-Trimethylbenzene	18.30	105	15651	0.256	ng	99
83) n-Decane	18.42	57	7247	0.215	ng	98
84) Benzyl Chloride	18.43	91	11112	0.205	ng	97
85) 1,3-Dichlorobenzene	18.45	146	10197	0.276	ng	97
86) 1,4-Dichlorobenzene	18.52	146	10173	0.258	ng	99
87) sec-Butylbenzene	18.59	105	20853	0.252	ng	98
88) 4-Isopropyltoluene (p-...	18.75	119	19515	0.260	ng	96
89) 1,2,3-Trimethylbenzene	18.74	105	15855	0.245	ng	98
90) 1,2-Dichlorobenzene	18.88	146	9644	0.267	ng	97
91) d-Limonene	18.91	68	5131	0.203	ng	100
92) 1,2-Dibromo-3-Chloropr...	19.35	157	2964	0.219	ng	92
93) n-Undecane	19.75	57	7441	0.206	ng	98
94) 1,2,4-Trichlorobenzene	20.70	180	7378	0.282	ng	98
95) Naphthalene	20.81	128	22358	0.267	ng	100
96) n-Dodecane	20.85	57	7488	0.225	ng	98
97) Hexachlorobutadiene	21.18	225	4631	0.295	ng	99
98) Cyclohexanone	16.16	55	4340	0.200	ng	97
99) tert-Butylbenzene	18.30	119	15954	0.263	ng	98
100) n-Butylbenzene	19.20	91	16116	0.249	ng	97

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091515.D
Acq On : 9 an 2015 18:55 Operator: SC
Sample : 0.20ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

Quant Time: an 12 09:05:53 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091516.D
Acq On : 9 an 2015 19:29 Operator: SC
Sample : 0.40ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:04:37 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	177249	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.00	114	902179	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	333473	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	246095	11.396	ng		-0.02
Spiked Amount 12.500			Recovery = 91.20%				
57) Toluene-d8 (SS2)	13.44	98	859379	12.913	ng		0.00
Spiked Amount 12.500			Recovery = 103.28%				
73) Bromofluorobenzene (SS3)	16.96	174	323029	14.788	ng		0.00
Spiked Amount 12.500			Recovery = 118.32%				
Target Compounds							Qvalue
2) Propene	3.82	42	5537	0.288	ng		98
3) Dichlorodifluoromethan...	3.92	85	12675	0.353	ng		99
4) Chloromethane	4.11	50	8987	0.316	ng		94
5) 1,2-Dichloro-1,1,2,2-t...	4.27	135	7976	0.418	ng		97
6) Vinyl Chloride	4.39	62	9609	0.337	ng		100
7) 1,3-Butadiene	4.56	54	6018	0.377	ng		97
8) Bromomethane	4.86	94	7044	0.394	ng		98
9) Chloroethane	5.07	64	5005	0.352	ng		97
10) Ethanol	5.24	45	21795	1.695	ng		97
11) Acetonitrile	5.46	41	10886	0.325	ng		78
12) Acrolein	5.61	56	3749	0.382	ng		96
13) Acetone	5.74	58	25418	1.882	ng		100
14) Trichlorofluoromethane	5.93	101	11331	0.402	ng		96
15) 2-Propanol (Isopropanol)	6.05	45	30216	0.703	ng		96
16) Acrylonitrile	6.26	53	7307	0.334	ng		93
17) 1,1-Dichloroethene	6.62	96	6841	0.407	ng		98
18) 2-Methyl-2-Propanol (t...	6.71	59	32933	0.774	ng		98
19) Methylene Chloride	6.75	84	9681	0.547	ng		98
20) 3-Chloro-1-propene (Al...	6.89	41	8014	0.323	ng		98
21) Trichlorotrifluoroethane	7.08	151	5845	0.383	ng		99
22) Carbon Disulfide	7.05	76	23201	0.368	ng		98
23) trans-1,2-Dichloroethene	7.78	61	9113	0.388	ng		100
24) 1,1-Dichloroethane	7.99	63	11736	0.365	ng		99
25) Methyl tert-Butyl Ether	8.09	73	21039	0.428	ng		99
26) Vinyl Acetate	8.17	86	7526	1.786	ng	#	88
27) 2-Butanone (MEK)	8.43	72	4423	0.374	ng	#	89
28) cis-1,2-Dichloroethene	8.86	61	9503	0.412	ng		98
29) Diisopropyl Ether	9.12	87	7503	0.491	ng	#	68
30) Ethyl Acetate	9.11	61	4766	0.770	ng		92
31) n-Hexane	9.12	57	11260	0.382	ng		100
32) Chloroform	9.16	83	11970	0.401	ng		94
34) Tetrahydrofuran (THF)	9.60	72	4805	0.419	ng		97
35) Ethyl tert-Butyl Ether	9.67	87	8618	0.444	ng		97
36) 1,2-Dichloroethane	9.92	62	8650	0.414	ng		96
38) 1,1,1-Trichloroethane	10.19	97	10914	0.423	ng		97
39) Isopropyl Acetate	10.57	61	8234	0.824	ng		99
40) 1-Butanol	10.59	56	12156	0.712	ng		89
41) Benzene	10.64	78	29919	0.423	ng		99
42) Carbon Tetrachloride	10.80	117	9598	0.457	ng		99
43) Cyclohexane	10.93	84	22128	0.842	ng		99
44) tert-Amyl Methyl Ether	11.26	73	20298	0.427	ng		99
45) 1,2-Dichloropropane	11.46	63	6881	0.375	ng		98
46) Bromodichloromethane	11.64	83	9332	0.404	ng		98
47) Trichloroethene	11.70	130	8707	0.470	ng		99
48) 1,4-Dioxane	11.70	88	5897	0.383	ng		98
49) 2,2,4-Trimethylpentane...	11.77	57	28271	0.376	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091516.D
Acq On : 9 an 2015 19:29 Operator: SC
Sample : 0.40ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

Quant Time: an 12 09:04:37 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

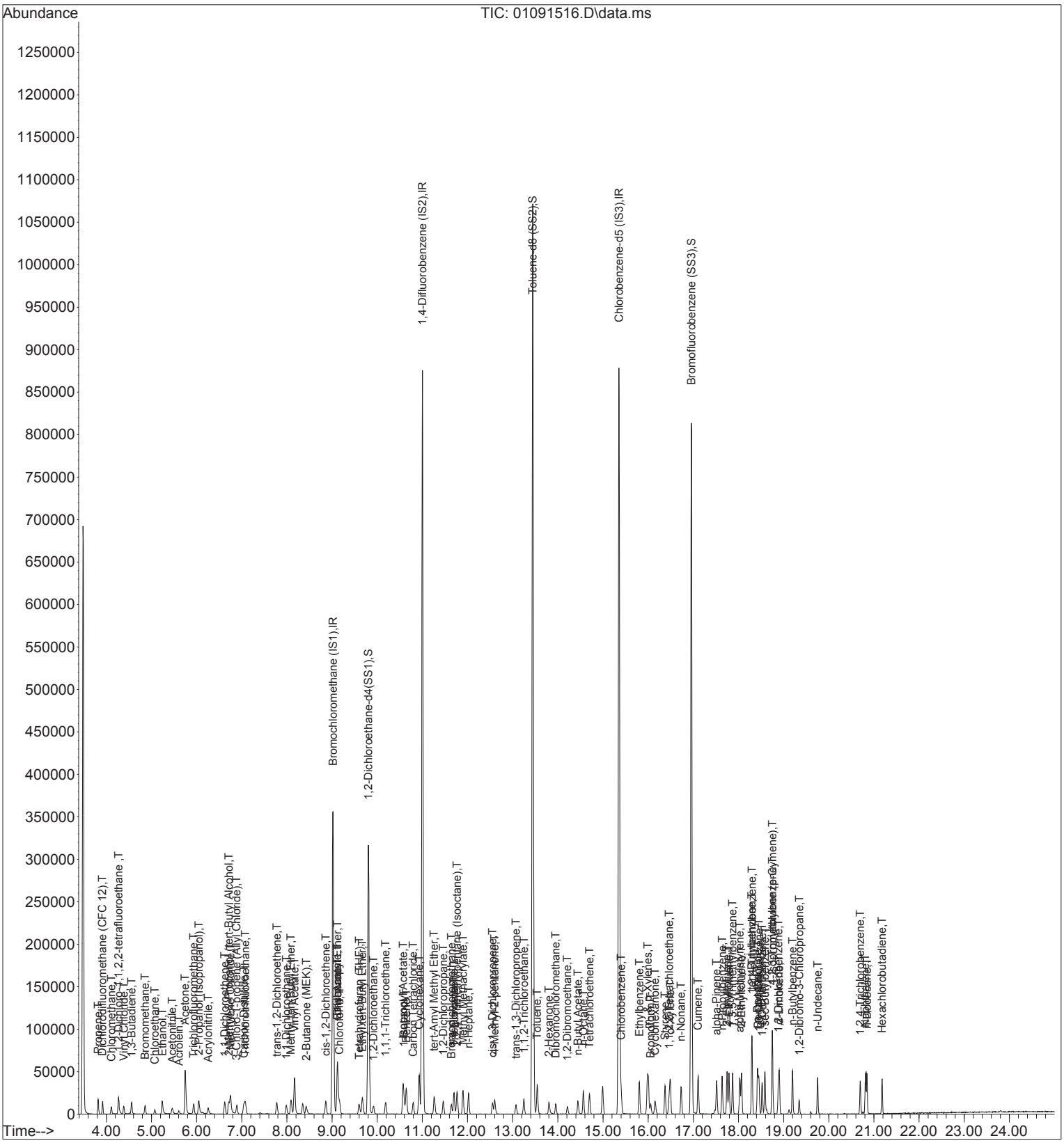
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.90	100	5913	0.845	ng	97
51) n-Heptane	12.03	71	7134	0.422	ng	98
52) cis-1,3-Dichloropropene	12.55	75	10025	0.387	ng	97
53) 4-Methyl-2-pentanone	12.60	58	5789	0.366	ng	92
54) trans-1,3-Dichloropropene	13.07	75	8771	0.366	ng	100
55) 1,1,2-Trichloroethane	13.25	97	7332	0.428	ng	99
58) Toluene	13.54	91	31501	0.446	ng	99
59) 2-Hexanone	13.80	43	12671	0.361	ng	98
60) Dibromochloromethane	13.95	129	8732	0.469	ng	96
61) 1,2-Dibromoethane	14.21	107	7991	0.445	ng	98
62) n-Butyl Acetate	14.44	43	13869	0.397	ng	99
63) n-Octane	14.57	57	5535	0.391	ng	98
64) Tetrachloroethene	14.70	166	9250	0.450	ng	100
65) Chlorobenzene	15.40	112	21468	0.461	ng	98
66) Ethylbenzene	15.81	91	34816	0.458	ng	99
67) m- p- ylenes	15.99	91	54733	0.913	ng	99
68) Bromoform	16.05	173	7298	0.470	ng	99
69) Styrene	16.37	104	21792	0.466	ng	99
70) o- ylene	16.49	91	27423	0.446	ng	99
71) n-Nonane	16.73	43	12551	0.383	ng	97
72) 1,1,2,2-Tetrachloroethane	16.46	83	12185	0.380	ng	99
74) Cumene	17.10	105	36300	0.457	ng	100
75) alpha-Pinene	17.51	93	17720	0.456	ng	91
76) n-Propylbenzene	17.64	91	40778	0.421	ng	99
77) 3-Ethyltoluene	17.75	105	35121	0.467	ng	100
78) 4-Ethyltoluene	17.79	105	34303	0.463	ng	99
79) 1,3,5-Trimethylbenzene	17.87	105	30113	0.475	ng	99
80) alpha-Methylstyrene	18.03	118	16235	0.480	ng	98
81) 2-Ethyltoluene	18.06	105	35045	0.475	ng	99
82) 1,2,4-Trimethylbenzene	18.30	105	29644	0.484	ng	99
83) n-Decane	18.42	57	13841	0.410	ng	97
84) Benzyl Chloride	18.43	91	22608	0.417	ng	98
85) 1,3-Dichlorobenzene	18.45	146	19337	0.523	ng	100
86) 1,4-Dichlorobenzene	18.52	146	19418	0.491	ng	99
87) sec-Butylbenzene	18.59	105	39367	0.475	ng	99
88) 4-Isopropyltoluene (p-...	18.75	119	37328	0.497	ng	98
89) 1,2,3-Trimethylbenzene	18.75	105	31495	0.486	ng	100
90) 1,2-Dichlorobenzene	18.88	146	18124	0.500	ng	98
91) d-Limonene	18.90	68	10468	0.414	ng	99
92) 1,2-Dibromo-3-Chloropr...	19.35	157	6028	0.445	ng	97
93) n-Undecane	19.75	57	14192	0.392	ng	100
94) 1,2,4-Trichlorobenzene	20.70	180	14557	0.556	ng	99
95) Naphthalene	20.81	128	44207	0.527	ng	99
96) n-Dodecane	20.85	57	14572	0.437	ng	99
97) Hexachlorobutadiene	21.18	225	8936	0.568	ng	97
98) Cyclohexanone	16.15	55	8800	0.406	ng	97
99) tert-Butylbenzene	18.30	119	29612	0.487	ng	98
100) n-Butylbenzene	19.20	91	31497	0.486	ng	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091516.D
Acq On : 9 an 2015 19:29 Operator: SC
Sample : 0.40ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081511 (2/6)
ALS Vial : 13 Sample Multiplier: 1

Quant Time: an 12 09:04:37 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091517.D
Acq On : 9 an 2015 20:02 Operator: SC
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081505 (2/6)
ALS Vial : 14 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:03:19 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	177763	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.00	114	901804	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	15.35	82	335427	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.80	65	246999	11.405	ng		-0.02
Spiked Amount 12.500			Recovery = 91.28%				
57) Toluene-d8 (SS2)	13.44	98	857935	12.816	ng		0.00
Spiked Amount 12.500			Recovery = 102.56%				
73) Bromofluorobenzene (SS3)	16.95	174	321161	14.617	ng		0.00
Spiked Amount 12.500			Recovery = 116.96%				
Target Compounds							Qvalue
2) Propene	3.80	42	14889	0.773	ng		99
3) Dichlorodifluoromethan...	3.90	85	33628	0.935	ng		100
4) Chloromethane	4.10	50	24589	0.861	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.26	135	21470	1.122	ng		99
6) Vinyl Chloride	4.37	62	25445	0.891	ng		99
7) 1,3-Butadiene	4.55	54	16869	1.055	ng		98
8) Bromomethane	4.85	94	17941	1.002	ng		100
9) Chloroethane	5.06	64	12937	0.908	ng		99
10) Ethanol	5.23	45	61159	4.742	ng		100
11) Acetonitrile	5.45	41	28646	0.853	ng		91
12) Acrolein	5.59	56	10169	1.034	ng		98
13) Acetone	5.74	58	63133	4.662	ng		96
14) Trichlorofluoromethane	5.93	101	30941	1.096	ng		99
15) 2-Propanol (Isopropanol)	6.03	45	81872	1.901	ng		95
16) Acrylonitrile	6.25	53	20994	0.957	ng		97
17) 1,1-Dichloroethene	6.62	96	18627	1.105	ng		97
18) 2-Methyl-2-Propanol (t...	6.69	59	88387	2.071	ng		98
19) Methylene Chloride	6.75	84	21618	1.218	ng		99
20) 3-Chloro-1-propene (Al...	6.89	41	22107	0.889	ng		99
21) Trichlorotrifluoroethane	7.08	151	17307	1.131	ng		97
22) Carbon Disulfide	7.04	76	61629	0.976	ng		100
23) trans-1,2-Dichloroethene	7.77	61	24314	1.032	ng		100
24) 1,1-Dichloroethane	7.98	63	30995	0.962	ng		97
25) Methyl tert-Butyl Ether	8.08	73	55176	1.120	ng		100
26) Vinyl Acetate	8.16	86	20612	4.877	ng	#	93
27) 2-Butanone (MEK)	8.41	72	12089	1.020	ng		98
28) cis-1,2-Dichloroethene	8.86	61	23959	1.036	ng		99
29) Diisopropyl Ether	9.11	87	19802	1.293	ng	#	70
30) Ethyl Acetate	9.11	61	13000	2.094	ng		95
31) n-Hexane	9.12	57	29880	1.010	ng		99
32) Chloroform	9.16	83	32045	1.070	ng		99
34) Tetrahydrofuran (THF)	9.58	72	12525	1.088	ng		98
35) Ethyl tert-Butyl Ether	9.66	87	23366	1.201	ng		97
36) 1,2-Dichloroethane	9.92	62	22379	1.068	ng		99
38) 1,1,1-Trichloroethane	10.19	97	27943	1.083	ng		99
39) Isopropyl Acetate	10.56	61	22131	2.217	ng		98
40) 1-Butanol	10.57	56	34928	2.047	ng		94
41) Benzene	10.64	78	79456	1.125	ng		100
42) Carbon Tetrachloride	10.80	117	25635	1.222	ng		100
43) Cyclohexane	10.93	84	58881	2.241	ng		98
44) tert-Amyl Methyl Ether	11.26	73	53012	1.116	ng		99
45) 1,2-Dichloropropane	11.46	63	18259	0.995	ng		99
46) Bromodichloromethane	11.64	83	25297	1.096	ng		99
47) Trichloroethene	11.70	130	22969	1.240	ng		100
48) 1,4-Dioxane	11.69	88	16400	1.064	ng		99
49) 2,2,4-Trimethylpentane...	11.77	57	75383	1.002	ng		100

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091517.D
Acq On : 9 an 2015 20:02 Operator: SC
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081505 (2/6)
ALS Vial : 14 Sample Multiplier: 1

Quant Time: an 12 09:03:19 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

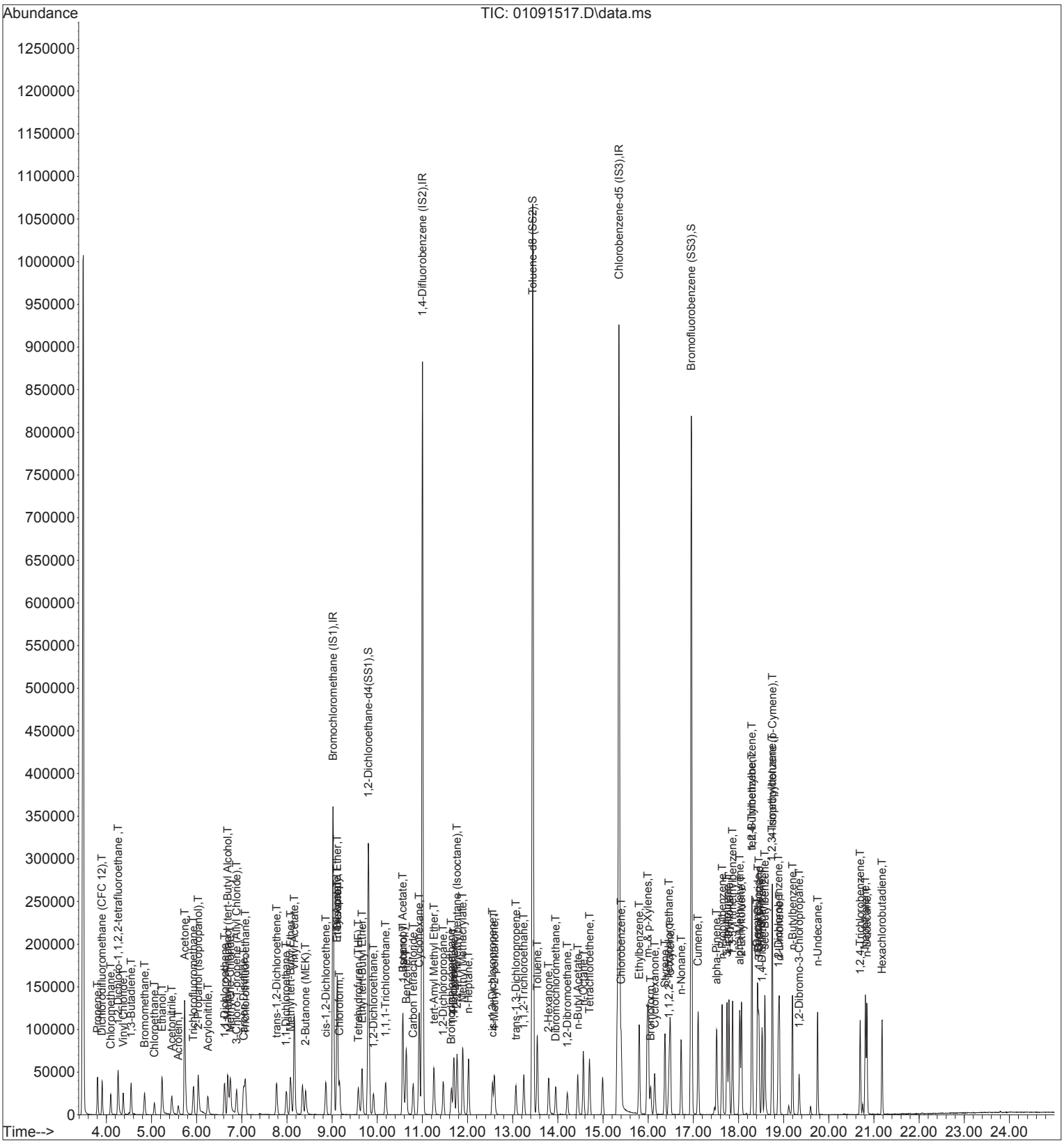
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.89	100	16164	2.310	ng	98
51) n-Heptane	12.02	71	18950	1.122	ng	99
52) cis-1,3-Dichloropropene	12.55	75	27590	1.066	ng	99
53) 4-Methyl-2-pentanone	12.60	58	16436	1.039	ng	98
54) trans-1,3-Dichloropropene	13.07	75	24357	1.017	ng	100
55) 1,1,2-Trichloroethane	13.24	97	19894	1.162	ng	98
58) Toluene	13.55	91	84481	1.190	ng	100
59) 2-Hexanone	13.79	43	36185	1.025	ng	98
60) Dibromochloromethane	13.95	129	23068	1.231	ng	100
61) 1,2-Dibromoethane	14.21	107	21837	1.209	ng	98
62) n-Butyl Acetate	14.44	43	39268	1.119	ng	99
63) n-Octane	14.57	57	15138	1.063	ng	99
64) Tetrachloroethene	14.70	166	25258	1.221	ng	100
65) Chlorobenzene	15.40	112	58476	1.249	ng	100
66) Ethylbenzene	15.80	91	95014	1.242	ng	100
67) m- p- ylenes	15.99	91	150461	2.495	ng	100
68) Bromoform	16.05	173	20352	1.303	ng	99
69) Styrene	16.37	104	60682	1.291	ng	100
70) o- ylene	16.49	91	74491	1.204	ng	99
71) n-Nonane	16.73	43	33111	1.004	ng	97
72) 1,1,2,2-Tetrachloroethane	16.46	83	33522	1.039	ng	98
74) Cumene	17.10	105	97271	1.218	ng	99
75) alpha-Pinene	17.51	93	47821	1.224	ng	99
76) n-Propylbenzene	17.64	91	114091	1.170	ng	99
77) 3-Ethyltoluene	17.75	105	97060	1.282	ng	99
78) 4-Ethyltoluene	17.79	105	94511	1.268	ng	100
79) 1,3,5-Trimethylbenzene	17.87	105	80578	1.263	ng	100
80) alpha-Methylstyrene	18.03	118	45025	1.323	ng	98
81) 2-Ethyltoluene	18.06	105	95417	1.286	ng	99
82) 1,2,4-Trimethylbenzene	18.30	105	82022	1.331	ng	100
83) n-Decane	18.42	57	38198	1.125	ng	99
84) Benzyl Chloride	18.43	91	62935	1.153	ng	99
85) 1,3-Dichlorobenzene	18.45	146	51706	1.390	ng	99
86) 1,4-Dichlorobenzene	18.52	146	51360	1.292	ng	99
87) sec-Butylbenzene	18.58	105	108760	1.306	ng	99
88) 4-Isopropyltoluene (p-...	18.75	119	101869	1.348	ng	99
89) 1,2,3-Trimethylbenzene	18.74	105	84329	1.295	ng	99
90) 1,2-Dichlorobenzene	18.88	146	49883	1.369	ng	98
91) d-Limonene	18.91	68	27926	1.098	ng	99
92) 1,2-Dibromo-3-Chloropr...	19.34	157	17165	1.259	ng	99
93) n-Undecane	19.75	57	39539	1.086	ng	98
94) 1,2,4-Trichlorobenzene	20.70	180	39052	1.483	ng	99
95) Naphthalene	20.81	128	122669	1.454	ng	99
96) n-Dodecane	20.84	57	40154	1.196	ng	98
97) Hexachlorobutadiene	21.18	225	24037	1.519	ng	98
98) Cyclohexanone	16.15	55	24356	1.117	ng	98
99) tert-Butylbenzene	18.30	119	80268	1.311	ng	100
100) n-Butylbenzene	19.20	91	85687	1.315	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091517.D
Acq On : 9 an 2015 20:02 Operator: SC
Sample : 1.0ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081505 (2/6)
ALS Vial : 14 Sample Multiplier: 1

Quant Time: an 12 09:03:19 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091518.D
Acq On : 9 an 2015 20:36 Operator: SC
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081505 (2/6)
ALS Vial : 14 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:00:13 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.03	130	183734	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.01	114	932987	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.35	82	343459	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.81	65	253684	11.333	ng		-0.01
Spiked Amount 12.500			Recovery = 90.64%				
57) Toluene-d8 (SS2)	13.44	98	886598	12.934	ng		0.00
Spiked Amount 12.500			Recovery = 103.44%				
73) Bromofluorobenzene (SS3)	16.96	174	334032	14.847	ng		0.00
Spiked Amount 12.500			Recovery = 118.80%				
Target Compounds							Qvalue
2) Propene	3.79	42	67685	3.401	ng		99
3) Dichlorodifluoromethan...	3.89	85	152663	4.107	ng		99
4) Chloromethane	4.09	50	101992	3.456	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.25	135	94818	4.796	ng		100
6) Vinyl Chloride	4.36	62	113773	3.853	ng		99
7) 1,3-Butadiene	4.54	54	76751	4.643	ng		99
8) Bromomethane	4.84	94	82737	4.469	ng		100
9) Chloroethane	5.05	64	59079	4.013	ng		100
10) Ethanol	5.24	45	272264	20.426	ng		100
11) Acetonitrile	5.45	41	131481	3.787	ng		99
12) Acrolein	5.59	56	45137	4.440	ng		99
13) Acetone	5.73	58	293631	20.979	ng		99
14) Trichlorofluoromethane	5.92	101	139664	4.786	ng		99
15) 2-Propanol (Isopropanol)	6.04	45	381510	8.569	ng		98
16) Acrylonitrile	6.25	53	102592	4.523	ng		100
17) 1,1-Dichloroethene	6.61	96	87714	5.036	ng		99
18) 2-Methyl-2-Propanol (t...	6.69	59	401820	9.107	ng		100
19) Methylene Chloride	6.75	84	90066	4.910	ng		99
20) 3-Chloro-1-propene (Al...	6.88	41	104844	4.081	ng		97
21) Trichlorotrifluoroethane	7.08	151	78562	4.967	ng		100
22) Carbon Disulfide	7.04	76	293278	4.492	ng		100
23) trans-1,2-Dichloroethene	7.78	61	114379	4.699	ng		99
24) 1,1-Dichloroethane	7.99	63	147402	4.424	ng		100
25) Methyl tert-Butyl Ether	8.06	73	258729	5.083	ng		100
26) Vinyl Acetate	8.16	86	101604	23.259	ng	#	89
27) 2-Butanone (MEK)	8.41	72	57744	4.716	ng		96
28) cis-1,2-Dichloroethene	8.87	61	112380	4.699	ng		100
29) Diisopropyl Ether	9.11	87	74993	4.738	ng	#	93
30) Ethyl Acetate	9.10	61	60846	9.483	ng		98
31) n-Hexane	9.11	57	136337	4.458	ng		99
32) Chloroform	9.17	83	147246	4.756	ng		100
34) Tetrahydrofuran (THF)	9.57	72	58103	4.884	ng		100
35) Ethyl tert-Butyl Ether	9.66	87	109753	5.460	ng		100
36) 1,2-Dichloroethane	9.92	62	102268	4.722	ng		100
38) 1,1,1-Trichloroethane	10.19	97	131280	4.917	ng		100
39) Isopropyl Acetate	10.56	61	105420	10.206	ng		96
40) 1-Butanol	10.56	56	172906	9.794	ng		96
41) Benzene	10.64	78	360471	4.934	ng		99
42) Carbon Tetrachloride	10.80	117	119623	5.510	ng		99
43) Cyclohexane	10.93	84	274769	10.108	ng		99
44) tert-Amyl Methyl Ether	11.25	73	250357	5.094	ng		100
45) 1,2-Dichloropropane	11.46	63	84467	4.450	ng		99
46) Bromodichloromethane	11.64	83	118771	4.974	ng		99
47) Trichloroethene	11.70	130	104240	5.438	ng		98
48) 1,4-Dioxane	11.68	88	77118	4.837	ng		99
49) 2,2,4-Trimethylpentane...	11.77	57	349804	4.495	ng		100

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091518.D
Acq On : 9 an 2015 20:36 Operator: SC
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081505 (2/6)
ALS Vial : 14 Sample Multiplier: 1

Quant Time: an 12 09:00:13 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

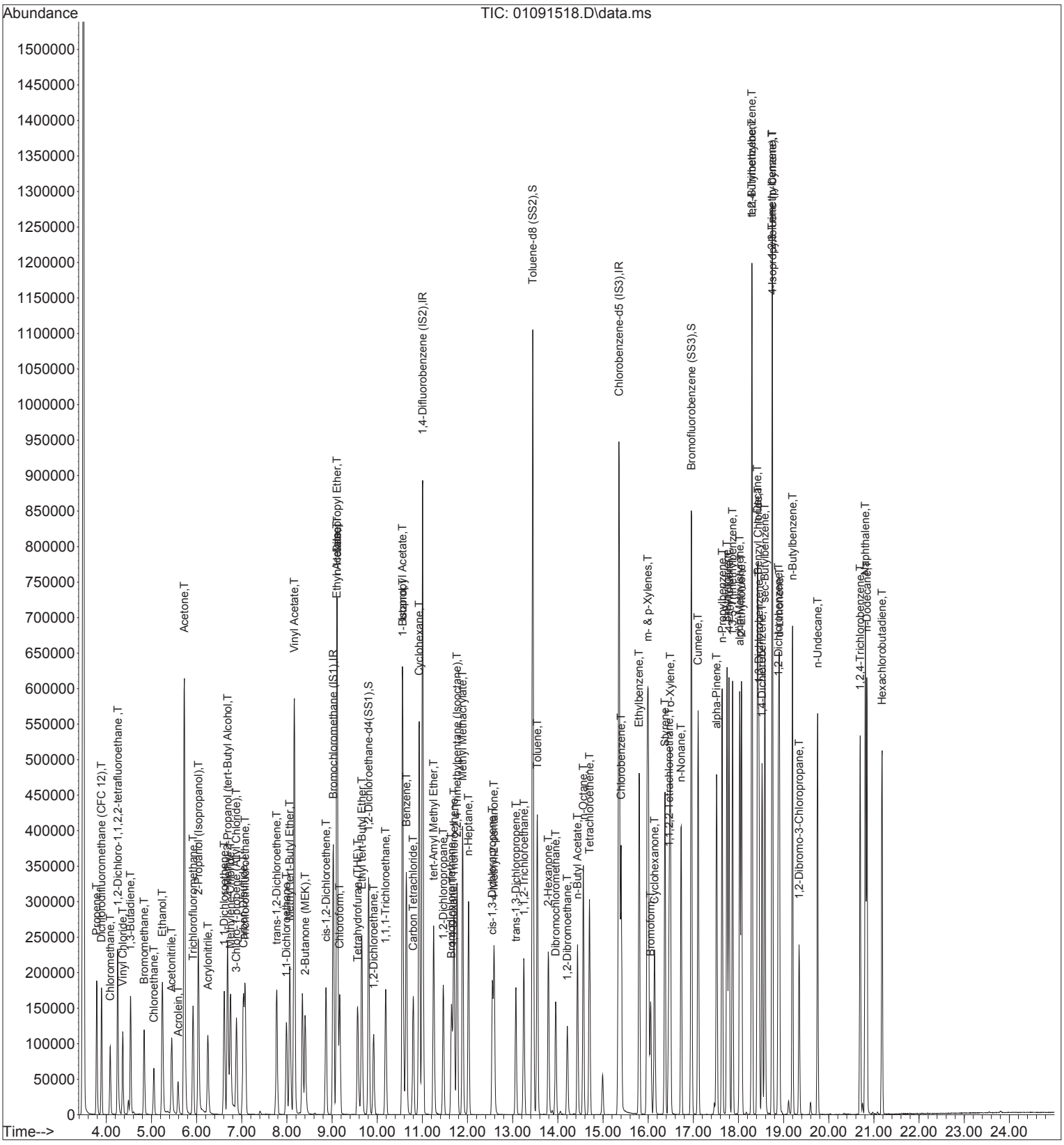
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.89	100	78412	10.833	ng	98
51) n-Heptane	12.02	71	87302	4.997	ng	99
52) cis-1,3-Dichloropropene	12.55	75	135102	5.046	ng	99
53) 4-Methyl-2-pentanone	12.59	58	78317	4.786	ng	98
54) trans-1,3-Dichloropropene	13.07	75	122729	4.952	ng	99
55) 1,1,2-Trichloroethane	13.25	97	90809	5.129	ng	99
58) Toluene	13.55	91	391808	5.390	ng	99
59) 2-Hexanone	13.79	43	173560	4.800	ng	99
60) Dibromochloromethane	13.95	129	109774	5.721	ng	100
61) 1,2-Dibromoethane	14.21	107	104781	5.664	ng	99
62) n-Butyl Acetate	14.44	43	195294	5.433	ng	99
63) n-Octane	14.57	57	71420	4.899	ng	99
64) Tetrachloroethene	14.70	166	118027	5.571	ng	99
65) Chlorobenzene	15.40	112	268429	5.600	ng	99
66) Ethylbenzene	15.80	91	437834	5.591	ng	100
67) m- p- ylenes	15.99	91	696058	11.271	ng	100
68) Bromoform	16.05	173	98411	6.151	ng	100
69) Styrene	16.37	104	289629	6.019	ng	100
70) o- ylene	16.49	91	350230	5.530	ng	99
71) n-Nonane	16.73	43	153877	4.558	ng	99
72) 1,1,2,2-Tetrachloroethane	16.46	83	160616	4.861	ng	100
74) Cumene	17.11	105	451548	5.520	ng	100
75) alpha-Pinene	17.51	93	228282	5.705	ng	99
76) n-Propylbenzene	17.64	91	532929	5.338	ng	99
77) 3-Ethyltoluene	17.75	105	459952	5.935	ng	100
78) 4-Ethyltoluene	17.79	105	442164	5.793	ng	99
79) 1,3,5-Trimethylbenzene	17.87	105	382738	5.858	ng	100
80) alpha-Methylstyrene	18.03	118	218119	6.259	ng	99
81) 2-Ethyltoluene	18.06	105	443963	5.843	ng	99
82) 1,2,4-Trimethylbenzene	18.30	105	388635	6.159	ng	99
83) n-Decane	18.42	57	179856	5.174	ng	98
84) Benzyl Chloride	18.43	91	331437	5.931	ng	99
85) 1,3-Dichlorobenzene	18.45	146	244882	6.431	ng	100
86) 1,4-Dichlorobenzene	18.52	146	242988	5.970	ng	100
87) sec-Butylbenzene	18.58	105	511468	5.998	ng	99
88) 4-Isopropyltoluene (p-...	18.75	119	484954	6.269	ng	99
89) 1,2,3-Trimethylbenzene	18.74	105	400537	6.006	ng	100
90) 1,2-Dichlorobenzene	18.88	146	234205	6.278	ng	100
91) d-Limonene	18.91	68	136704	5.249	ng	99
92) 1,2-Dibromo-3-Chloropr...	19.34	157	84635	6.061	ng	98
93) n-Undecane	19.75	57	187964	5.043	ng	98
94) 1,2,4-Trichlorobenzene	20.70	180	190615	7.068	ng	99
95) Naphthalene	20.81	128	597269	6.916	ng	99
96) n-Dodecane	20.84	57	194033	5.645	ng	98
97) Hexachlorobutadiene	21.18	225	112051	6.915	ng	100
98) Cyclohexanone	16.14	55	118405	5.302	ng	99
99) tert-Butylbenzene	18.30	119	381559	6.087	ng	99
100) n-Butylbenzene	19.20	91	402695	6.033	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091518.D
Acq On : 9 an 2015 20:36 Operator: SC
Sample : 5.0ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081505 (2/6)
ALS Vial : 14 Sample Multiplier: 1

Quant Time: an 12 09:00:13 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091519.D
Acq On : 9 an 2015 21:10 Operator: SC
Sample : 25ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081504 (2/6)
ALS Vial : 3 Sample Multiplier: 1

1/12/15

Quant Time: an 12 08:57:41 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 09 09:16:59 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.04	130	199975	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	11.01	114	1016965	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	15.36	82	374241	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.82	65	271255	11.134	ng		-0.02
Spiked Amount 12.500			Recovery = 89.04%				
57) Toluene-d8 (SS2)	13.45	98	959175	12.842	ng		-0.01
Spiked Amount 12.500			Recovery = 102.72%				
73) Bromofluorobenzene (SS3)	16.96	174	365136	14.895	ng		0.00
Spiked Amount 12.500			Recovery = 119.12%				
Target Compounds							Qvalue
2) Propene	3.79	42	396264	18.297	ng		99
3) Dichlorodifluoromethan...	3.89	85	890816	22.020	ng		100
4) Chloromethane	4.09	50	622809	19.392	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.25	135	552144	25.658	ng		100
6) Vinyl Chloride	4.37	62	659824	20.532	ng		99
7) 1,3-Butadiene	4.55	54	476397	26.477	ng		97
8) Bromomethane	4.85	94	501045	24.865	ng		99
9) Chloroethane	5.06	64	352166	21.979	ng		99
10) Ethanol	5.28	45	1624211	111.955	ng		98
11) Acetonitrile	5.47	41	782227	20.698	ng		100
12) Acrolein	5.60	56	277627	25.090	ng		99
13) Acetone	5.74	58	1682675	110.458	ng		98
14) Trichlorofluoromethane	5.93	101	813580	25.615	ng		99
15) 2-Propanol (Isopropanol)	6.06	45	2302220	47.508	ng		100
16) Acrylonitrile	6.27	53	619346	25.086	ng		99
17) 1,1-Dichloroethene	6.62	96	517308	27.291	ng		88
18) 2-Methyl-2-Propanol (t...	6.71	59	2469210	51.418	ng		97
19) Methylene Chloride	6.77	84	528178	26.456	ng		85
20) 3-Chloro-1-propene (Al...	6.89	41	633280	22.646	ng		91
21) Trichlorotrifluoroethane	7.08	151	458377	26.629	ng		90
22) Carbon Disulfide	7.04	76	1745362	24.563	ng		100
23) trans-1,2-Dichloroethene	7.79	61	682071	25.746	ng		90
24) 1,1-Dichloroethane	8.00	63	863565	23.815	ng		99
25) Methyl tert-Butyl Ether	8.06	73	1535437	27.714	ng		96
26) Vinyl Acetate	8.18	86	628164	132.117	ng	#	68
27) 2-Butanone (MEK)	8.41	72	353803	26.546	ng	#	78
28) cis-1,2-Dichloroethene	8.88	61	671671	25.806	ng		90
29) Diisopropyl Ether	9.11	87	446620	25.927	ng	#	65
30) Ethyl Acetate	9.11	61	360671	51.647	ng		91
31) n-Hexane	9.12	57	790573	23.753	ng		98
32) Chloroform	9.18	83	882071	26.176	ng		100
34) Tetrahydrofuran (THF)	9.56	72	347328	26.826	ng	#	85
35) Ethyl tert-Butyl Ether	9.66	87	642980	29.388	ng	#	88
36) 1,2-Dichloroethane	9.93	62	604461	25.640	ng		100
38) 1,1,1-Trichloroethane	10.20	97	780361	26.814	ng		97
39) Isopropyl Acetate	10.56	61	624755	55.491	ng	#	91
40) 1-Butanol	10.57	56	1075111	55.869	ng		95
41) Benzene	10.66	78	2124855	26.681	ng		100
42) Carbon Tetrachloride	10.81	117	720305	30.441	ng		100
43) Cyclohexane	10.94	84	1624160	54.814	ng		91
44) tert-Amyl Methyl Ether	11.25	73	1483370	27.689	ng		96
45) 1,2-Dichloropropane	11.47	63	505929	24.454	ng		100
46) Bromodichloromethane	11.65	83	707423	27.182	ng		100
47) Trichloroethene	11.71	130	635974	30.436	ng		100
48) 1,4-Dioxane	11.67	88	468732	26.973	ng		91
49) 2,2,4-Trimethylpentane...	11.77	57	2060656	24.290	ng		100

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091519.D
Acq On : 9 an 2015 21:10 Operator: SC
Sample : 25ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081504 (2/6)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: an 12 08:57:41 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 09 09:16:59 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

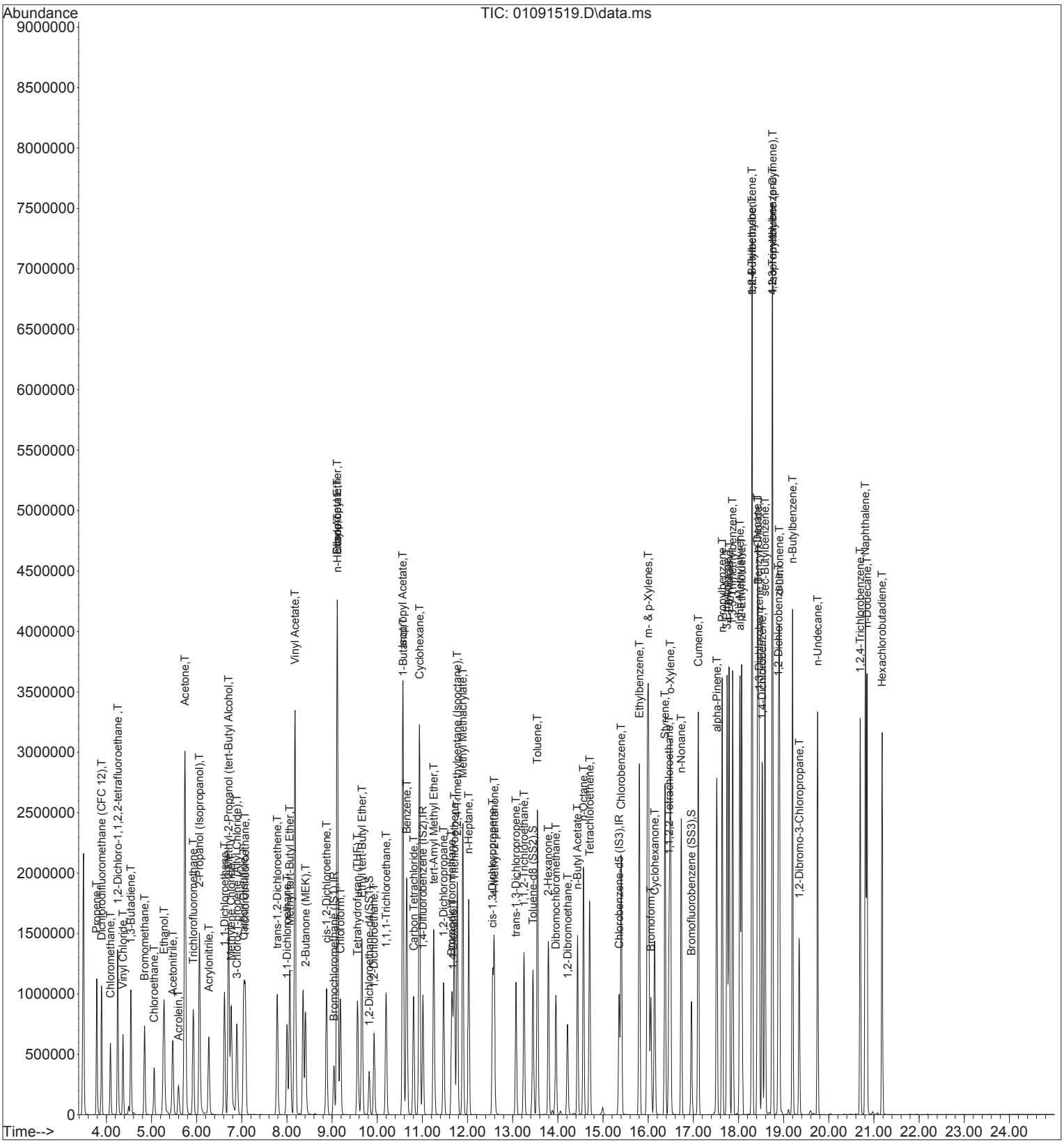
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
50) Methyl Methacrylate	11.90	100	479896	60.824	ng	#	81
51) n-Heptane	12.03	71	525290	27.585	ng		94
52) cis-1,3-Dichloropropene	12.55	75	820927	28.128	ng		100
53) 4-Methyl-2-pentanone	12.59	58	475689	26.669	ng		90
54) trans-1,3-Dichloropropene	13.07	75	748996	27.727	ng		100
55) 1,1,2-Trichloroethane	13.25	97	549535	28.474	ng		94
58) Toluene	13.55	91	2321417	29.309	ng		100
59) 2-Hexanone	13.79	43	1050422	26.662	ng		95
60) Dibromochloromethane	13.96	129	674576	32.264	ng		99
61) 1,2-Dibromoethane	14.21	107	633850	31.444	ng		100
62) n-Butyl Acetate	14.44	43	1173750	29.968	ng		96
63) n-Octane	14.57	57	424432	26.718	ng		90
64) Tetrachloroethene	14.71	166	703543	30.477	ng		100
65) Chlorobenzene	15.40	112	1590521	30.452	ng		99
66) Ethylbenzene	15.81	91	2607183	30.552	ng		98
67) m- p- ylenes	16.00	91	4150822	61.686	ng		98
68) Bromoform	16.06	173	618180	35.463	ng		100
69) Styrene	16.37	104	1754852	33.471	ng		98
70) o- ylene	16.49	91	2092209	30.316	ng		98
71) n-Nonane	16.73	43	905485	24.615	ng		91
72) 1,1,2,2-Tetrachloroethane	16.46	83	966285	26.837	ng		100
74) Cumene	17.11	105	2698718	30.278	ng		99
75) alpha-Pinene	17.52	93	1340837	30.753	ng		98
76) n-Propylbenzene	17.64	91	3160154	29.047	ng		97
77) 3-Ethyltoluene	17.75	105	2667312	31.589	ng		98
78) 4-Ethyltoluene	17.80	105	2724976	32.767	ng		98
79) 1,3,5-Trimethylbenzene	17.87	105	2294841	32.232	ng		98
80) alpha-Methylstyrene	18.03	118	1326504	34.932	ng		99
81) 2-Ethyltoluene	18.07	105	2655931	32.079	ng		98
82) 1,2,4-Trimethylbenzene	18.30	105	2338229	34.006	ng		98
83) n-Decane	18.42	57	1061506	28.023	ng		95
84) Benzyl Chloride	18.44	91	2098032	34.454	ng		97
85) 1,3-Dichlorobenzene	18.46	146	1486345	35.822	ng		99
86) 1,4-Dichlorobenzene	18.53	146	1463162	32.992	ng		100
87) sec-Butylbenzene	18.59	105	3070414	33.045	ng		98
88) 4-Isopropyltoluene (p-...	18.75	119	2912547	34.552	ng		98
89) 1,2,3-Trimethylbenzene	18.75	105	2409888	33.162	ng		98
90) 1,2-Dichlorobenzene	18.88	146	1415320	34.820	ng		100
91) d-Limonene	18.91	68	833936	29.387	ng		91
92) 1,2-Dibromo-3-Chloropr...	19.35	157	528484	34.736	ng		88
93) n-Undecane	19.75	57	1119644	27.570	ng		95
94) 1,2,4-Trichlorobenzene	20.70	180	1139499	38.775	ng		99
95) Naphthalene	20.81	128	3569409	37.932	ng		100
96) n-Dodecane	20.85	57	1155949	30.863	ng		94
97) Hexachlorobutadiene	21.18	225	678738	38.440	ng		100
98) Cyclohexanone	16.14	55	724330	29.764	ng		93
99) tert-Butylbenzene	18.30	119	2282007	33.408	ng		100
100) n-Butylbenzene	19.20	91	2430568	33.420	ng		98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091519.D
Acq On : 9 an 2015 21:10 Operator: SC
Sample : 25ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081504 (2/6)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: an 12 08:57:41 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 09 09:16:59 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091520.D
Acq On : 9 an 2015 21:43 Operator: SC
Sample : 50ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081504 (2/6)
ALS Vial : 3 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:11:06 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.05	130	195493	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	11.02	114	1004241	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.36	82	374390	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.83	65	267553	11.234	ng		0.00
Spiked Amount 12.500			Recovery = 89.84%				
57) Toluene-d8 (SS2)	13.45	98	961865	12.873	ng		0.00
Spiked Amount 12.500			Recovery = 102.96%				
73) Bromofluorobenzene (SS3)	16.96	174	365840	14.917	ng		0.00
Spiked Amount 12.500			Recovery = 119.36%				
Target Compounds							Qvalue
2) Propene	3.79	42	761316	35.958	ng		100
3) Dichlorodifluoromethan...	3.89	85	1655722	41.865	ng		99
4) Chloromethane	4.09	50	1047980	33.379	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.25	135	1051858	50.001	ng		100
6) Vinyl Chloride	4.37	62	1249716	39.779	ng		100
7) 1,3-Butadiene	4.55	54	900407	51.190	ng		99
8) Bromomethane	4.85	94	903494	45.866	ng		99
9) Chloroethane	5.06	64	643639	41.092	ng		100
10) Ethanol	5.30	45	2950232	208.019	ng		100
11) Acetonitrile	5.48	41	1473578	39.886	ng		100
12) Acrolein	5.60	56	526318	48.655	ng		100
13) Acetone	5.75	58	3079737	206.802	ng		99
14) Trichlorofluoromethane	5.93	101	1549633	49.908	ng		100
15) 2-Propanol (Isopropanol)	6.08	45	4172974	88.086	ng		99
16) Acrylonitrile	6.28	53	1164194	48.236	ng		99
17) 1,1-Dichloroethene	6.62	96	981310	52.956	ng		100
18) 2-Methyl-2-Propanol (t...	6.72	59	4370831	93.103	ng		100
19) Methylene Chloride	6.77	84	997985	51.135	ng		99
20) 3-Chloro-1-propene (Al...	6.90	41	1197223	43.795	ng		100
21) Trichlorotrifluoroethane	7.08	151	890617	52.925	ng		99
22) Carbon Disulfide	7.05	76	3294642	47.429	ng		100
23) trans-1,2-Dichloroethene	7.79	61	1288790	49.763	ng		100
24) 1,1-Dichloroethane	8.01	63	1604322	45.258	ng		99
25) Methyl tert-Butyl Ether	8.07	73	2875917	53.099	ng		100
26) Vinyl Acetate	8.19	86	1174688	252.727	ng	#	94
27) 2-Butanone (MEK)	8.42	72	667890	51.261	ng		99
28) cis-1,2-Dichloroethene	8.88	61	1257307	49.414	ng		100
29) Diisopropyl Ether	9.12	87	832968	49.465	ng	#	93
30) Ethyl Acetate	9.12	61	661114	96.840	ng		99
31) n-Hexane	9.12	57	1429723	43.941	ng		99
32) Chloroform	9.19	83	1668847	50.659	ng		100
34) Tetrahydrofuran (THF)	9.57	72	650162	51.367	ng		100
35) Ethyl tert-Butyl Ether	9.66	87	1223363	57.198	ng		99
36) 1,2-Dichloroethane	9.93	62	1149486	49.877	ng		100
38) 1,1,1-Trichloroethane	10.20	97	1486807	51.736	ng		100
39) Isopropyl Acetate	10.57	61	1154034	103.800	ng		99
40) 1-Butanol	10.59	56	2002700	105.391	ng		100
41) Benzene	10.66	78	4016886	51.078	ng		100
42) Carbon Tetrachloride	10.81	117	1381126	59.107	ng		100
43) Cyclohexane	10.94	84	3056562	104.464	ng		99
44) tert-Amyl Methyl Ether	11.25	73	2827955	53.456	ng		100
45) 1,2-Dichloropropane	11.48	63	951933	46.595	ng		100
46) Bromodichloromethane	11.65	83	1344402	52.311	ng		100
47) Trichloroethene	11.71	130	1203777	58.340	ng		100
48) 1,4-Dioxane	11.68	88	881770	51.384	ng		100
49) 2,2,4-Trimethylpentane...	11.78	57	3845507	45.904	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091520.D
Acq On : 9 an 2015 21:43 Operator: SC
Sample : 50ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081504 (2/6)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: an 12 09:11:06 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

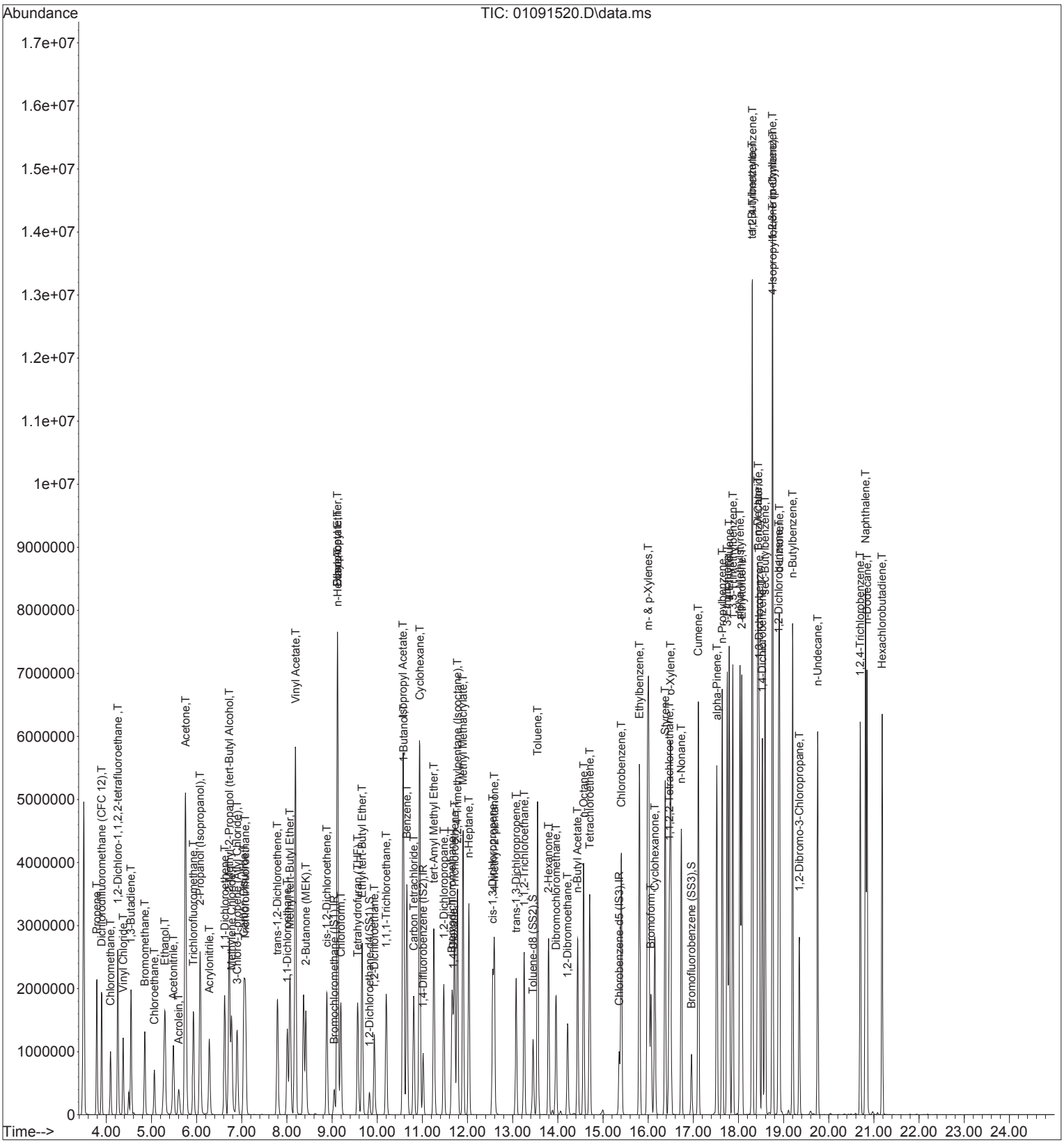
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.90	100	914453	117.370	ng	98
51) n-Heptane	12.03	71	988974	52.593	ng	100
52) cis-1,3-Dichloropropene	12.56	75	1568952	54.440	ng	100
53) 4-Methyl-2-pentanone	12.59	58	906159	51.446	ng	98
54) trans-1,3-Dichloropropene	13.08	75	1468094	55.036	ng	100
55) 1,1,2-Trichloroethane	13.25	97	1061638	55.705	ng	100
58) Toluene	13.55	91	4474933	56.476	ng	100
59) 2-Hexanone	13.79	43	2015612	51.141	ng	100
60) Dibromochloromethane	13.96	129	1315194	62.878	ng	100
61) 1,2-Dibromoethane	14.21	107	1230152	61.001	ng	100
62) n-Butyl Acetate	14.44	43	2248613	57.388	ng	100
63) n-Octane	14.57	57	808943	50.903	ng	99
64) Tetrachloroethene	14.71	166	1370822	59.360	ng	100
65) Chlorobenzene	15.41	112	3090152	59.141	ng	100
66) Ethylbenzene	15.81	91	5031712	58.941	ng	100
67) m- p- ylenes	16.00	91	8049827	119.583	ng	100
68) Bromoform	16.06	173	1223364	70.152	ng	100
69) Styrene	16.38	104	3400080	64.825	ng	99
70) o- ylene	16.50	91	4061244	58.824	ng	100
71) n-Nonane	16.73	43	1716009	46.629	ng	99
72) 1,1,2,2-Tetrachloroethane	16.47	83	1858807	51.604	ng	99
74) Cumene	17.11	105	5196223	58.275	ng	100
75) alpha-Pinene	17.52	93	2600106	59.611	ng	99
76) n-Propylbenzene	17.64	91	6064436	55.720	ng	100
77) 3-Ethyltoluene	17.75	105	5337769	63.189	ng	100
78) 4-Ethyltoluene	17.80	105	5126361	61.619	ng	100
79) 1,3,5-Trimethylbenzene	17.88	105	4454851	62.546	ng	100
80) alpha-Methylstyrene	18.03	118	2579864	67.910	ng	99
81) 2-Ethyltoluene	18.08	105	5164742	62.356	ng	100
82) 1,2,4-Trimethylbenzene	18.31	105	4519910	65.708	ng	99
83) n-Decane	18.43	57	1987950	52.460	ng	99
84) Benzyl Chloride	18.44	91	4132036	67.830	ng	99
85) 1,3-Dichlorobenzene	18.46	146	2923091	70.421	ng	100
86) 1,4-Dichlorobenzene	18.53	146	2882267	64.966	ng	100
87) sec-Butylbenzene	18.59	105	5937665	63.878	ng	100
88) 4-Isopropyltoluene (p-...	18.76	119	5498350	65.201	ng	99
89) 1,2,3-Trimethylbenzene	18.75	105	4611657	63.435	ng	100
90) 1,2-Dichlorobenzene	18.89	146	2694677	66.270	ng	100
91) d-Limonene	18.91	68	1573205	55.415	ng	98
92) 1,2-Dibromo-3-Chloropr...	19.35	157	1015350	66.710	ng	100
93) n-Undecane	19.75	57	2077563	51.137	ng	99
94) 1,2,4-Trichlorobenzene	20.70	180	2210116	75.176	ng	100
95) Naphthalene	20.81	128	6926455	73.579	ng	100
96) n-Dodecane	20.85	57	2191870	58.498	ng	99
97) Hexachlorobutadiene	21.18	225	1334564	75.553	ng	100
98) Cyclohexanone	16.15	55	1401723	57.577	ng	100
99) tert-Butylbenzene	18.30	119	4383273	64.144	ng	100
100) n-Butylbenzene	19.20	91	4571280	62.830	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091520.D
Acq On : 9 an 2015 21:43 Operator: SC
Sample : 50ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081504 (2/6)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: an 12 09:11:06 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:00:03 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091521.D
Acq On : 9 an 2015 22:17 Operator: SC
Sample : 100ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081504 (2/6)
ALS Vial : 3 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:12:50 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 08:59:43 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.06	130	207749	12.500	ng		0.02
37) 1,4-Difluorobenzene (IS2)	11.02	114	1074817	12.500	ng		0.01
56) Chlorobenzene-d5 (IS3)	15.36	82	364331	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.84	65	287247	11.349	ng		0.02
Spiked Amount 12.500			Recovery = 90.80%				
57) Toluene-d8 (SS2)	13.45	98	934164	12.848	ng		0.00
Spiked Amount 12.500			Recovery = 102.80%				
73) Bromofluorobenzene (SS3)	16.96	174	354232	14.843	ng		0.00
Spiked Amount 12.500			Recovery = 118.72%				
Target Compounds							Qvalue
2) Propene	3.80	42	1659618	73.762	ng		99
3) Dichlorodifluoromethan...	3.90	85	3329466	79.219	ng		100
4) Chloromethane	4.10	50	1719492	51.536	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.27	135	2096100	93.762	ng		100
6) Vinyl Chloride	4.38	62	2426169	72.669	ng		100
7) 1,3-Butadiene	4.56	54	1726334	92.355	ng		99
8) Bromomethane	4.86	94	1739590	83.101	ng		99
9) Chloroethane	5.07	64	1267961	76.175	ng		100
10) Ethanol	5.33	45	5725126	379.861	ng		100
11) Acetonitrile	5.51	41	2921151	74.403	ng		99
12) Acrolein	5.62	56	1049799	91.323	ng		100
13) Acetone	5.78	58	5862008	370.408	ng		98
14) Trichlorofluoromethane	5.94	101	3082093	93.407	ng		100
15) 2-Propanol (Isopropanol)	6.10	45	7413571	147.259	ng		99
16) Acrylonitrile	6.30	53	2319652	90.439	ng		99
17) 1,1-Dichloroethene	6.63	96	1971828	100.132	ng		99
18) 2-Methyl-2-Propanol (t...	6.75	59	7193552	144.191	ng		100
19) Methylene Chloride	6.79	84	2031534	97.950	ng		98
20) 3-Chloro-1-propene (Al...	6.91	41	2422734	83.396	ng		99
21) Trichlorotrifluoroethane	7.09	151	1834986	102.611	ng		98
22) Carbon Disulfide	7.05	76	6639130	89.937	ng		100
23) trans-1,2-Dichloroethene	7.80	61	2642844	96.026	ng		99
24) 1,1-Dichloroethane	8.02	63	3213727	85.311	ng		99
25) Methyl tert-Butyl Ether	8.08	73	5574392	96.849	ng		100
26) Vinyl Acetate	8.21	86	2322147	470.123	ng	#	80
27) 2-Butanone (MEK)	8.43	72	1385609	100.072	ng		97
28) cis-1,2-Dichloroethene	8.89	61	2556095	94.532	ng		99
29) Diisopropyl Ether	9.12	87	1668009	93.209	ng	#	82
30) Ethyl Acetate	9.14	61	1260049	173.684	ng		97
31) n-Hexane	9.13	57	2712570	78.450	ng		98
32) Chloroform	9.21	83	3448047	98.493	ng		100
34) Tetrahydrofuran (THF)	9.57	72	1341679	99.748	ng		99
35) Ethyl tert-Butyl Ether	9.67	87	2532248	111.410	ng		98
36) 1,2-Dichloroethane	9.94	62	2372782	96.883	ng		99
38) 1,1,1-Trichloroethane	10.21	97	3051786	99.220	ng		100
39) Isopropyl Acetate	10.58	61	2272390	190.970	ng		97
40) 1-Butanol	10.61	56	4025579	197.933	ng		100
41) Benzene	10.67	78	8215238	97.605	ng		100
42) Carbon Tetrachloride	10.82	117	2858850	114.314	ng		100
43) Cyclohexane	10.95	84	6174643	197.174	ng		97
44) tert-Amyl Methyl Ether	11.26	73	5505953	97.243	ng		99
45) 1,2-Dichloropropane	11.48	63	1827411	83.575	ng		100
46) Bromodichloromethane	11.66	83	2619831	95.245	ng		100
47) Trichloroethene	11.72	130	2356292	106.697	ng		100
48) 1,4-Dioxane	11.69	88	1706540	92.917	ng		99
49) 2,2,4-Trimethylpentane...	11.78	57	7265220	81.031	ng		98

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091521.D
Acq On : 9 an 2015 22:17 Operator: SC
Sample : 100ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081504 (2/6)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: an 12 09:12:50 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 08:59:43 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

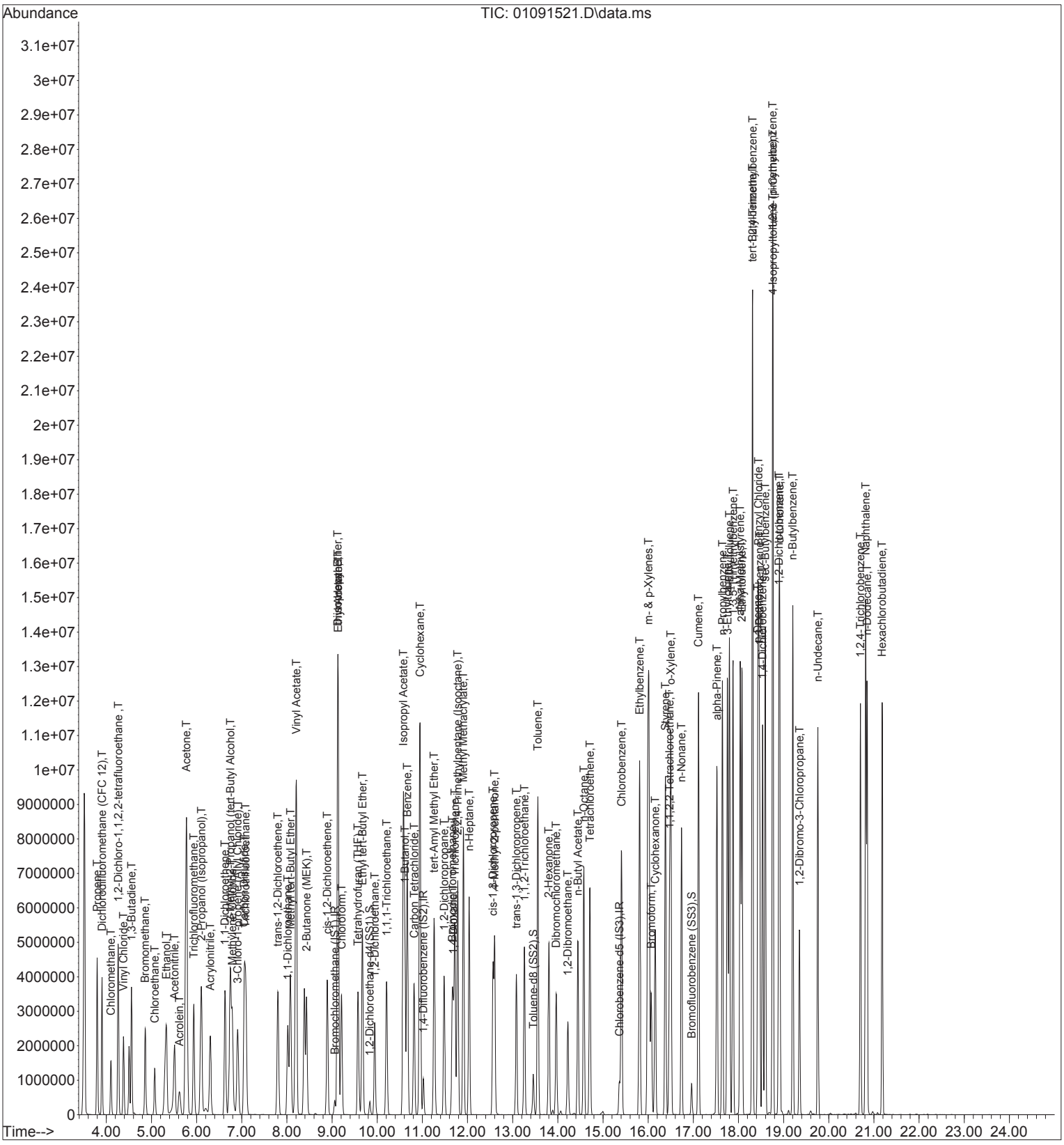
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.91	100	1767401	211.951	ng	96
51) n-Heptane	12.04	71	1891262	93.972	ng	99
52) cis-1,3-Dichloropropene	12.56	75	2997113	97.166	ng	100
53) 4-Methyl-2-pentanone	12.60	58	1699093	90.130	ng	98
54) trans-1,3-Dichloropropene	13.08	75	2792818	97.823	ng	100
55) 1,1,2-Trichloroethane	13.26	97	2000634	98.082	ng	99
58) Toluene	13.56	91	8372864	108.587	ng	100
59) 2-Hexanone	13.80	43	3717395	96.923	ng	99
60) Dibromochloromethane	13.96	129	2497818	122.716	ng	100
61) 1,2-Dibromoethane	14.22	107	2320743	118.258	ng	100
62) n-Butyl Acetate	14.44	43	4143319	108.663	ng	100
63) n-Octane	14.58	57	1496265	96.753	ng	98
64) Tetrachloroethene	14.71	166	2605072	115.921	ng	100
65) Chlorobenzene	15.41	112	5798455	114.037	ng	100
66) Ethylbenzene	15.81	91	9362972	112.704	ng	99
67) m- p- ylenes	16.01	91	15069699	230.046	ng	99
68) Bromoform	16.07	173	2365932	139.417	ng	100
69) Styrene	16.38	104	6386583	125.127	ng	99
70) o- ylene	16.50	91	7680116	114.313	ng	100
71) n-Nonane	16.74	43	3097697	86.498	ng	97
72) 1,1,2,2-Tetrachloroethane	16.47	83	3476346	99.175	ng	99
74) Cumene	17.12	105	9742031	112.273	ng	99
75) alpha-Pinene	17.52	93	4895803	115.343	ng	100
76) n-Propylbenzene	17.64	91	11285268	106.553	ng	99
77) 3-Ethyltoluene	17.76	105	10154940	123.535	ng	100
78) 4-Ethyltoluene	17.80	105	9484002	117.145	ng	99
79) 1,3,5-Trimethylbenzene	17.88	105	8433034	121.668	ng	100
80) alpha-Methylstyrene	18.04	118	4891263	132.308	ng	100
81) 2-Ethyltoluene	18.08	105	9710402	120.474	ng	99
82) 1,2,4-Trimethylbenzene	18.31	105	8460201	126.386	ng	99
83) n-Decane	18.43	57	3523658	95.553	ng	96
84) Benzyl Chloride	18.44	91	7826955	132.033	ng	99
85) 1,3-Dichlorobenzene	18.46	146	5575871	138.038	ng	100
86) 1,4-Dichlorobenzene	18.53	146	5469982	126.696	ng	100
87) sec-Butylbenzene	18.59	105	11050961	122.171	ng	99
88) 4-Isopropyltoluene (p-...	18.76	119	10254404	124.957	ng	98
89) 1,2,3-Trimethylbenzene	18.75	105	8723687	123.310	ng	99
90) 1,2-Dichlorobenzene	18.90	146	5211426	131.702	ng	100
91) d-Limonene	18.91	68	2929856	106.052	ng	95
92) 1,2-Dibromo-3-Chloropr...	19.35	157	1980069	133.686	ng	100
93) n-Undecane	19.76	57	3801919	96.164	ng	98
94) 1,2,4-Trichlorobenzene	20.70	180	4227887	147.779	ng	100
95) Naphthalene	20.82	128	12752872	139.212	ng	99
96) n-Dodecane	20.85	57	3922252	107.569	ng	97
97) Hexachlorobutadiene	21.18	225	2580021	150.093	ng	100
98) Cyclohexanone	16.16	55	2621496	110.654	ng	98
99) tert-Butylbenzene	18.31	119	8182218	123.043	ng	100
100) n-Butylbenzene	19.20	91	8684428	122.659	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091521.D
Acq On : 9 an 2015 22:17 Operator: SC
Sample : 100ng TO-15 ICAL STD
Misc : S29-01081412/S29-01081504 (2/6)
ALS Vial : 3 Sample Multiplier: 1

Quant Time: an 12 09:12:50 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 08:59:43 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091523.D
Acq On : 9 an 2015 23:24 Operator: SC
Sample : 25ng TO-15 ICV STD
Misc : S29-12081401/S29-01051502 (2/3)
ALS Vial : 4 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:23:57 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.04	130	188644	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	11.01	114	958748	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.36	82	351154	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.82	65	257967	12.402	ng		0.00
Spiked Amount 12.500			Recovery = 99.20%				
57) Toluene-d8 (SS2)	13.45	98	905087	12.510	ng		0.00
Spiked Amount 12.500			Recovery = 100.08%				
73) Bromofluorobenzene (SS3)	16.96	174	344580	12.706	ng		0.00
Spiked Amount 12.500			Recovery = 101.68%				
Target Compounds							Qvalue
2) Propene	3.79	42	388269	24.484	ng		98
3) Dichlorodifluoromethan...	3.89	85	915086	24.860	ng		100
4) Chloromethane	4.09	50	571255	24.172	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.25	135	558234	25.628	ng		99
6) Vinyl Chloride	4.37	62	633441	24.072	ng		99
7) 1,3-Butadiene	4.54	54	546171	32.233	ng		100
8) Bromomethane	4.85	94	465321	24.889	ng		100
9) Chloroethane	5.06	64	328072	24.766	ng		99
10) Ethanol	5.27	45	1440872	120.950	ng		100
11) Acetonitrile	5.47	41	714317	25.374	ng		99
12) Acrolein	5.60	56	246066	26.601	ng		100
13) Acetone	5.74	58	1580123	126.052	ng		99
14) Trichlorofluoromethane	5.93	101	832094	28.071	ng		100
15) 2-Propanol (Isopropanol)	6.06	45	2069566	52.919	ng		99
16) Acrylonitrile	6.27	53	569234	28.404	ng		99
17) 1,1-Dichloroethene	6.62	96	494566	27.025	ng		100
18) 2-Methyl-2-Propanol (t...	6.70	59	2266865	53.642	ng		100
19) Methylene Chloride	6.76	84	491755	24.694	ng		99
20) 3-Chloro-1-propene (Al...	6.89	41	584604	27.017	ng		99
21) Trichlorotrifluoroethane	7.08	151	443683	26.104	ng		99
22) Carbon Disulfide	7.04	76	1766166	27.963	ng		100
23) trans-1,2-Dichloroethene	7.78	61	649825	27.209	ng		100
24) 1,1-Dichloroethane	8.00	63	795881	25.732	ng		99
25) Methyl tert-Butyl Ether	8.06	73	1438360	26.968	ng		100
26) Vinyl Acetate	8.18	86	553870	136.141	ng		99
27) 2-Butanone (MEK)	8.41	72	329011	28.792	ng		99
28) cis-1,2-Dichloroethene	8.88	61	623255	25.170	ng		100
29) Diisopropyl Ether	9.11	87	410947	23.899	ng	#	95
30) Ethyl Acetate	9.11	61	347865	56.215	ng		98
31) n-Hexane	9.12	57	750740	26.269	ng		100
32) Chloroform	9.18	83	805664	26.141	ng		99
34) Tetrahydrofuran (THF)	9.56	72	319679	26.610	ng		100
35) Ethyl tert-Butyl Ether	9.66	87	599379	26.265	ng		100
36) 1,2-Dichloroethane	9.93	62	569411	26.220	ng		100
38) 1,1,1-Trichloroethane	10.20	97	728728	25.734	ng		100
39) Isopropyl Acetate	10.56	61	577192	58.286	ng		99
40) 1-Butanol	10.57	56	906081	57.017	ng		96
41) Benzene	10.65	78	1945254	24.311	ng		100
42) Carbon Tetrachloride	10.80	117	649609	27.133	ng		100
43) Cyclohexane	10.94	84	1505224	51.769	ng		100
44) tert-Amyl Methyl Ether	11.25	73	1406883	27.079	ng		100
45) 1,2-Dichloropropane	11.47	63	450083	25.376	ng		100
46) Bromodichloromethane	11.65	83	636898	26.233	ng		99
47) Trichloroethene	11.71	130	583061	25.419	ng		99
48) 1,4-Dioxane	11.67	88	425166	27.896	ng		100
49) 2,2,4-Trimethylpentane...	11.77	57	1879337	25.406	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091523.D
Acq On : 9 an 2015 23:24 Operator: SC
Sample : 25ng TO-15 ICV STD
Misc : S29-12081401/S29-01051502 (2/3)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: an 12 09:23:57 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

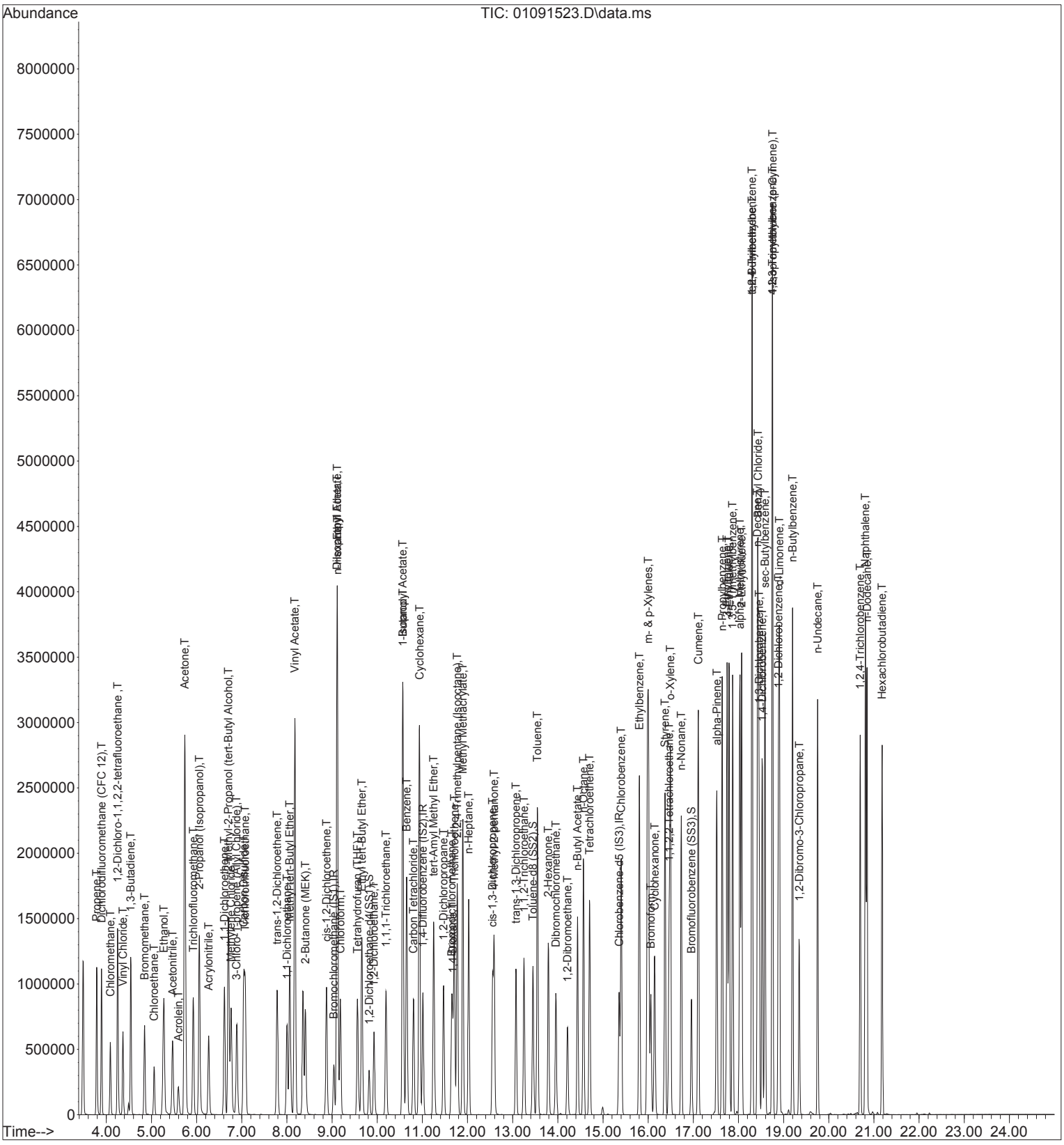
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.90	100	451763	58.164	ng	99
51) n-Heptane	12.03	71	479758	26.368	ng	100
52) cis-1,3-Dichloropropene	12.55	75	743312	26.804	ng	100
53) 4-Methyl-2-pentanone	12.59	58	437827	29.571	ng	100
54) trans-1,3-Dichloropropene	13.07	75	755758	31.601	ng	100
55) 1,1,2-Trichloroethane	13.25	97	488824	26.001	ng	100
58) Toluene	13.55	91	2153645	26.487	ng	100
59) 2-Hexanone	13.79	43	961038	29.283	ng	100
60) Dibromochloromethane	13.96	129	638918	28.736	ng	99
61) 1,2-Dibromoethane	14.21	107	581606	27.470	ng	100
62) n-Butyl Acetate	14.44	43	1192990	34.133	ng	100
63) n-Octane	14.57	57	400918	26.914	ng	99
64) Tetrachloroethene	14.70	166	647938	24.405	ng	100
65) Chlorobenzene	15.40	112	1456529	26.541	ng	100
66) Ethylbenzene	15.81	91	2358832	26.320	ng	100
67) m- p- ylenes	16.00	91	3791266	52.361	ng	99
68) Bromoform	16.06	173	577825	30.501	ng	100
69) Styrene	16.37	104	1574233	27.723	ng	99
70) o- ylene	16.49	91	1914929	25.780	ng	99
71) n-Nonane	16.73	43	844684	25.701	ng	100
72) 1,1,2,2-Tetrachloroethane	16.46	83	856906	25.635	ng	100
74) Cumene	17.11	105	2505457	25.544	ng	100
75) alpha-Pinene	17.52	93	1192954	25.348	ng	100
76) n-Propylbenzene	17.64	91	2965721	25.800	ng	100
77) 3-Ethyltoluene	17.75	105	2516779	26.776	ng	100
78) 4-Ethyltoluene	17.79	105	2539746	27.839	ng	100
79) 1,3,5-Trimethylbenzene	17.87	105	2087293	25.979	ng	100
80) alpha-Methylstyrene	18.03	118	1228699	28.288	ng	99
81) 2-Ethyltoluene	18.07	105	2518701	27.300	ng	100
82) 1,2,4-Trimethylbenzene	18.30	105	2123384	26.941	ng	100
83) n-Decane	18.42	57	994806	26.639	ng	100
84) Benzyl Chloride	18.43	91	1932928	32.216	ng	100
85) 1,3-Dichlorobenzene	18.46	146	1332154	27.476	ng	100
86) 1,4-Dichlorobenzene	18.53	146	1352764	25.796	ng	100
87) sec-Butylbenzene	18.59	105	2849959	27.313	ng	100
88) 4-Isopropyltoluene (p-...	18.76	119	2738568	27.405	ng	100
89) 1,2,3-Trimethylbenzene	18.75	105	2173016	26.109	ng	100
90) 1,2-Dichlorobenzene	18.88	146	1255113	26.161	ng	100
91) d-Limonene	18.91	68	787234	28.798	ng	100
92) 1,2-Dibromo-3-Chloropr...	19.35	157	481546	29.621	ng	100
93) n-Undecane	19.75	57	1061200	27.216	ng	100
94) 1,2,4-Trichlorobenzene	20.70	180	1017958	27.509	ng	100
95) Naphthalene	20.81	128	3216134	28.000	ng	100
96) n-Dodecane	20.85	57	1074793	29.312	ng	100
97) Hexachlorobutadiene	21.18	225	610344	26.668	ng	99
98) Cyclohexanone	16.15	55	615512	28.220	ng	100
99) tert-Butylbenzene	18.30	119	2157534	27.306	ng	100
100) n-Butylbenzene	19.20	91	2252304	28.507	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091523.D
Acq On : 9 an 2015 23:24 Operator: SC
Sample : 25ng TO-15 ICV STD
Misc : S29-12081401/S29-01051502 (2/3)
ALS Vial : 4 Sample Multiplier: 1

Quant Time: an 12 09:23:57 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



INITIAL CALIBRATION VERIFICATION CHECK SHEET

1/12/15

Data File Name: **01091523.D**
Data File Path: **I:\MS09\Data\2015_01\09**
Operator: **SC**
Date Acquired: **1/9/15** **23:24**

Acq. Method File: **TO15.M**
Sample Name: **25ng TO-15 ICV STD**
Misc Info: **S29-12081401/S29-01051502 (**
Instrument Name: **MS09**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail
2)	**Propene**	**3.79**	**24.5**	**25.00**	98	**70**	**130**	*
3)	**Dichlorodifluoromethane (CFC 12**	**3.89**	**24.9**	**25.50**	98	**70**	**130**	*
4)	**Chloromethane**	**4.09**	**24.2**	**24.75**	98	**70**	**130**	*
5)	**1,2-Dichloro-1,1,2,2-tetrafluoroetl**	**4.25**	**25.6**	**25.75**	99	**70**	**130**	*
6)	**Vinyl Chloride**	**4.37**	**24.1**	**25.25**	95	**70**	**130**	*
7)	**1,3-Butadiene**	**4.54**	**32.2**	**26.75**	120	**70**	**130**	*
8)	**Bromomethane**	**4.85**	**24.9**	**25.25**	99	**70**	**130**	*
9)	**Chloroethane**	**5.06**	**24.8**	**25.25**	98	**70**	**130**	*
10)	**Ethanol**	**5.27**	**121**	**127.25**	95	**70**	**130**	*
11)	**Acetonitrile**	**5.47**	**25.4**	**25.50**	100	**70**	**130**	*
12)	**Acrolein**	**5.60**	**26.6**	**26.75**	99	**70**	**130**	*
13)	**Acetone**	**5.74**	**126**	**135.00**	93	**70**	**130**	*
14)	**Trichlorofluoromethane**	**5.93**	**28.1**	**24.75**	114	**70**	**130**	*
15)	**2-Propanol (Isopropanol)**	**6.06**	**52.9**	**52.50**	101	**70**	**130**	*
16)	**Acrylonitrile**	**6.27**	**28.4**	**26.00**	109	**70**	**130**	*
17)	**1,1-Dichloroethene**	**6.62**	**27.0**	**26.75**	101	**70**	**130**	*
18)	2-Methyl-2-Propanol (tert-Butyl Alcc	6.70	53.6	52.75	102	**70**	**130**	*
19)	**Methylene Chloride**	**6.76**	**24.7**	**27.00**	91	**70**	**130**	*
20)	**3-Chloro-1-propene (Allyl Chlorid**	**6.89**	**27.0**	**27.25**	99	**70**	**130**	*
21)	**Trichlorotrifluoroethane**	**7.08**	**26.1**	**27.00**	97	**70**	**130**	*
22)	**Carbon Disulfide**	**7.04**	**28.0**	**24.50**	114	**70**	**130**	*
23)	**trans-1,2-Dichloroethene**	**7.78**	**27.2**	**26.50**	103	**70**	**130**	*
24)	**1,1-Dichloroethane**	**8.00**	**25.7**	**26.00**	99	**70**	**130**	*
25)	**Methyl tert-Butyl Ether**	**8.06**	**27.0**	**26.50**	102	**70**	**130**	*
26)	**Vinyl Acetate**	**8.18**	**136**	**128.00**	106	**70**	**130**	*
27)	**2-Butanone (MEK)**	**8.41**	**28.8**	**27.00**	107	**70**	**130**	*
28)	**cis-1,2-Dichloroethene**	**8.88**	**25.2**	**26.75**	94	**70**	**130**	*
29)	Diisopropyl Ether	9.11	23.9	27.25	88	**70**	**130**	*
30)	**Ethyl Acetate**	**9.11**	**56.2**	**53.50**	105	**70**	**130**	*
31)	**n-Hexane**	**9.12**	**26.3**	**26.25**	100	**70**	**130**	*
32)	**Chloroform**	**9.18**	**26.1**	**27.00**	97	**70**	**130**	*
34)	**Tetrahydrofuran (THF)**	**9.56**	**26.6**	**25.75**	103	**70**	**130**	*
35)	Ethyl tert-Butyl Ether	9.66	26.3	26.50	99	**70**	**130**	*
36)	**1,2-Dichloroethane**	**9.93**	**26.2**	**26.25**	100	**70**	**130**	*
38)	**1,1,1-Trichloroethane**	**10.20**	**25.7**	**26.00**	99	**70**	**130**	*
39)	Isopropyl Acetate	10.56	58.3	54.50	107	**70**	**130**	*
40)	1-Butanol	10.57	57.0	55.75	102	**70**	**130**	*
41)	**Benzene**	**10.65**	**24.3**	**27.50**	88	**70**	**130**	*
42)	**Carbon Tetrachloride**	**10.80**	**27.1**	**26.75**	101	**70**	**130**	*
43)	**Cyclohexane**	**10.94**	**51.8**	**52.75**	98	**70**	**130**	*
44)	tert-Amyl Methyl Ether	11.25	27.1	26.25	103	**70**	**130**	*
45)	**1,2-Dichloropropane**	**11.47**	**25.4**	**26.50**	96	**70**	**130**	*
46)	**Bromodichloromethane**	**11.65**	**26.2**	**27.00**	97	**70**	**130**	*
47)	**Trichloroethene**	**11.71**	**25.4**	**26.00**	98	**70**	**130**	*
48)	**1,4-Dioxane**	**11.67**	**27.9**	**27.25**	102	**70**	**130**	*
49)	2,2,4-Trimethylpentane (Isooctane)	11.77	25.4	26.00	98	**70**	**130**	*

INITIAL CALIBRATION VERIFICATION CHECK SHEET

Data File Name: **01091523.D** Acq. Method File: **TO15.M**
Data File Path: **I:\MS09\Data\2015_01\09** Sample Name: **25ng TO-15 ICV STD**
Operator: **SC** Misc Info: **S29-12081401/S29-01051502 (**
Date Acquired: **1/9/15** **23:24** Instrument Name: **MS09**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail
50)	**Methyl Methacrylate**	**11.90**	**58.2**	**52.50**	111	**70**	**130**	*
51)	**n-Heptane**	**12.03**	**26.4**	**26.75**	99	**70**	**130**	*
52)	**cis-1,3-Dichloropropene**	**12.55**	**26.8**	**28.25**	95	**70**	**130**	*
53)	**4-Methyl-2-pentanone**	**12.59**	**29.6**	**27.25**	109	**70**	**130**	*
54)	**trans-1,3-Dichloropropene**	**13.07**	**31.6**	**27.00**	117	**70**	**130**	*
55)	**1,1,2-Trichloroethane**	**13.25**	**26.0**	**26.50**	98	**70**	**130**	*
58)	**Toluene**	**13.55**	**26.5**	**26.50**	100	**70**	**130**	*
59)	**2-Hexanone**	**13.79**	**29.3**	**27.75**	106	**70**	**130**	*
60)	**Dibromochloromethane**	**13.96**	**28.7**	**27.50**	104	**70**	**130**	*
61)	**1,2-Dibromoethane**	**14.21**	**27.5**	**27.00**	102	**70**	**130**	*
62)	**n-Butyl Acetate**	**14.44**	**34.1**	**28.00**	122	**70**	**130**	*
63)	**n-Octane**	**14.57**	**26.9**	**26.00**	103	**70**	**130**	*
64)	**Tetrachloroethene**	**14.70**	**24.4**	**24.75**	99	**70**	**130**	*
65)	**Chlorobenzene**	**15.40**	**26.5**	**27.00**	98	**70**	**130**	*
66)	**Ethylbenzene**	**15.81**	**26.3**	**26.50**	99	**70**	**130**	*
67)	**m- & p-Xylenes**	**16.00**	**52.4**	**52.50**	100	**70**	**130**	*
68)	**Bromoform**	**16.06**	**30.5**	**27.00**	113	**70**	**130**	*
69)	**Styrene**	**16.37**	**27.7**	**27.25**	102	**70**	**130**	*
70)	**o-Xylene**	**16.49**	**25.8**	**25.75**	100	**70**	**130**	*
71)	**n-Nonane**	**16.73**	**25.7**	**25.50**	101	**70**	**130**	*
72)	**1,1,2,2-Tetrachloroethane**	**16.46**	**25.6**	**25.25**	101	**70**	**130**	*
74)	**Cumene**	**17.11**	**25.5**	**25.50**	100	**70**	**130**	*
75)	**alpha-Pinene**	**17.52**	**25.3**	**26.00**	97	**70**	**130**	*
76)	**n-Propylbenzene**	**17.64**	**25.8**	**25.25**	102	**70**	**130**	*
77)	3-Ethyltoluene	17.75	26.8	26.50	101	**70**	**130**	*
78)	**4-Ethyltoluene**	**17.79**	**27.8**	**26.50**	**105**	**70**	**130**	*
79)	**1,3,5-Trimethylbenzene**	**17.87**	**26.0**	**26.50**	**98**	**70**	**130**	*
80)	alpha-Methylstyrene	18.03	28.3	26.00	**109**	**70**	**130**	*
81)	2-Ethyltoluene	18.07	27.3	26.25	**104**	**70**	**130**	*
82)	**1,2,4-Trimethylbenzene**	**18.30**	**26.9**	**26.25**	**102**	**70**	**130**	*
83)	n-Decane	18.42	26.6	25.75	**103**	**70**	**130**	*
84)	**Benzyl Chloride**	**18.43**	**32.2**	**27.25**	**118**	**70**	**130**	*
85)	**1,3-Dichlorobenzene**	**18.46**	**27.5**	**27.25**	**101**	**70**	**130**	*
86)	**1,4-Dichlorobenzene**	**18.53**	**25.8**	**26.50**	**97**	**70**	**130**	*
87)	sec-Butylbenzene	18.59	27.3	26.75	**102**	**70**	**130**	*
88)	4-Isopropyltoluene (p-Cymene)	18.76	27.4	25.25	**109**	**70**	**130**	*
89)	1,2,3-Trimethylbenzene	18.75	26.1	26.25	**99**	**70**	**130**	*
90)	**1,2-Dichlorobenzene**	**18.88**	**26.2**	**26.75**	**98**	**70**	**130**	*
91)	**d-Limonene**	**18.91**	**28.8**	**26.25**	**110**	**70**	**130**	*
92)	**1,2-Dibromo-3-Chloropropane**	**19.35**	**29.6**	**25.75**	**115**	**70**	**130**	*
93)	n-Undecane	19.75	27.2	25.25	**108**	**70**	**130**	*
94)	**1,2,4-Trichlorobenzene**	**20.70**	**27.5**	**26.25**	**105**	**70**	**130**	*
95)	**Naphthalene**	**20.81**	**28.0**	**24.50**	**114**	**70**	**130**	*
96)	n-Dodecane	20.85	29.3	25.25	**116**	**70**	**130**	*
97)	**Hexachlorobutadiene**	**21.18**	**26.7**	**26.75**	**100**	**70**	**130**	*
98)	Cyclohexanone	16.15	28.2	27.75	102	**70**	**130**	*
99)	tert-Butylbenzene	18.30	27.3	26.50	103	**70**	**130**	*
100)	n-Butylbenzene	19.20	28.5	27.25	105	**70**	**130**	*

Bold = 75 Compound List
*** = Pass**

Response Factor Report MS09

Method Path : I:\MS09\Methods\
Method File : ACF9010915.M
Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
Last Update : Mon an 12 09:53:23 2015
Response Via : Initial Calibration

Calibration Files
0.40=01091527.D 1.0 =01091528.D 2.5 =01091529.D 5.0 =01091530.D 25 =01091531.D 50 =01091532.D 100 =01091533.D

	Compound	0.40	1.0	2.5	5.0	25	50	100	Avg	%RSD
1)	IR Bromochloromethane...	----------				ISTD	----------			
2)	T Chloropentaflu...	1.616	1.349	1.288	1.244	1.247	1.220	1.184	1.307	11.15
3)	T 1,1,1,2-Tetraf...	1.144	0.980	0.929	0.889	0.874	0.869	0.817	0.929	11.62
4)	T 1,1-Difluoroet...	1.073	0.932	0.876	0.841	0.826	0.797	0.704	0.864	13.42
5)	T Chlorodifluoro...	0.335	0.277	0.280	0.259	0.258	0.252	0.249	0.273	10.92
6)	T 1-Chloro-1,1-D...	2.209	1.823	1.844	1.760	1.694	1.736	1.708	1.825	9.78
7)	T Dichlorofluoro...	2.670	2.268	2.165	2.132	2.009	2.061	2.001	2.187	10.66
8)	T Vinylbromide	1.249	1.050	1.036	0.990	0.967	0.997	0.977	1.038	9.43
9)	T 2,2-Dichloro-1...	1.949	1.612	1.541	1.512	1.406	1.477	1.438	1.562	11.76
10)	T 2-Methylbutane	1.267	1.069	1.007	0.955	0.885	0.946	0.902	1.004	13.08
11)	T Methyl Acetate	2.415	2.037	1.994	1.947	2.044	1.977	1.925	2.048	8.16
12)	T 2-Methylpentane	1.320	1.102	1.078	1.037	1.057	1.015	0.990	1.086	10.14
13)	T 2,2-Dichloropr...	2.028	1.702	1.631	1.540	1.552	1.500	1.402	1.622	12.50
14)	T 1,1-Dichloropr...	1.935	1.620	1.563	1.518	1.542	1.494	1.472	1.592	9.98
15)	T Thiophene	3.099	2.586	2.567	2.468	2.520	2.438	2.408	2.584	9.14
16)	IR 1,4-Difluorobenzen...	----------				ISTD	----------			
17)	T 2,3-Dimethylpe...	0.443	0.382	0.357	0.348	0.356	0.341	0.328	0.365	10.51
18)	T Dibromomethane	0.222	0.200	0.190	0.183	0.194	0.188	0.187	0.195	6.81
19)	IR Chlorobenzene-d5 (...	----------				ISTD	----------			
20)	T Methyl Cyclohe...	0.966	0.833	0.802	0.768	0.742	0.694	0.612	0.774	14.47
21)	T 1,3-Dichloropr...	1.092	0.958	0.898	0.878	0.871	0.815	0.727	0.891	12.83
22)	T 1,1,1,2-Tetrac...	0.749	0.656	0.625	0.614	0.608	0.575	0.520	0.621	11.39
23)	T 1-Chlorohexane	1.096	0.968	0.940	0.916	0.900	0.847	0.758	0.918	11.41
24)	T 1,2,3-Trichlor...	1.027	0.908	0.860	0.841	0.783	0.790	0.708	0.845	12.11
25)	T Bromobenzene	1.281	1.099	1.051	1.017	0.942	0.958	0.865	1.031	13.06
26)	T 2-Chlorotoluene	2.400	2.065	1.981	1.913	1.758	1.771	1.598	1.927	13.51
27)	T 4-Chlorotoluene	2.499	2.098	2.055	1.989	1.848	1.876	1.695	2.009	12.74
28)	T Indan	3.110	2.715	2.642	2.688	2.421	2.394	2.147	2.588	11.82
29)	T Indene	2.606	2.338	2.320	2.326	2.160	2.162	1.949	2.266	9.01
30)	T 1,2,4,5-Tetram...	3.048	2.753	2.736	2.769	2.746	2.646	2.331	2.719	7.78
31)	T 1,2,3,4-Tetram...	3.317	2.941	2.809	2.840	2.819	2.576	2.373	2.811	10.49
32)	T 1,2,3,5-Tetram...	3.027	2.693	2.665	2.705	2.728	2.561	2.311	2.670	8.00
33)	T 1,2,3-Trichlor...	1.187	1.079	1.054	1.089	1.209	1.127	1.037	1.112	5.91

(#) = Out of Range

1/12/15

TO-15 CUSTOM COMPOUND LIST
ICAL CONCENTRATIONS

2/19/15

Std#:	Working Standards	
(1)	200 ng/L Working Std. ID:	S29-12301401
(2)	20 ng/L Working Std. ID:	S29-01091501

Injection Amts.(L):	0.020	0.025	0.050	0.125	0.250	0.125	0.250	0.500
Standards Used:	(2)	(2)	(2)	(2)	(2)	(1)	(1)	(1)
Compounds/ Concentrations (ng):	0.4ng	0.5ng	1.0ng	2.5ng	5.0ng	25ng	50ng	100ng
Vinylbromide	0.404	0.505	1.010	2.525	5.05	25.25	50.5	101
2-Methylbutane (Isopentane)	0.404	0.505	1.010	2.525	5.05	25.25	50.5	101
2-Methylpentane	0.396	0.495	0.990	2.475	4.95	24.75	49.5	99
2,2-Dichloropropane	0.408	0.510	1.020	2.550	5.10	25.50	51.0	102
1,1-Dichloropropene	0.412	0.515	1.030	2.575	5.15	25.75	51.5	103
Thiophene	0.404	0.505	1.010	2.525	5.05	25.25	50.5	101
2,3-Dimethylpentane	0.412	0.515	1.030	2.575	5.15	25.75	51.5	103
Dibromomethane	0.432	0.540	1.080	2.700	5.40	27.00	54.0	108
1,3-Dichloropropane	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
1,1,1,2-Tetrachloroethane	0.424	0.530	1.060	2.650	5.30	26.50	53.0	106
1-Chlorohexane	0.408	0.510	1.020	2.550	5.10	25.50	51.0	102
1,2,3-Trichloropropane	0.424	0.530	1.060	2.650	5.30	26.50	53.0	106
Bromobenzene	0.428	0.535	1.070	2.675	5.35	26.75	53.5	107
2-Chlorotoluene	0.436	0.545	1.090	2.725	5.45	27.25	54.5	109
4-Chlorotoluene	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
Indane	0.408	0.510	1.020	2.550	5.10	25.50	51.0	102
Indene	0.396	0.495	0.990	2.475	4.95	24.75	49.5	99
1,2,4,5-Tetramethylbenzene	0.400	0.500	1.000	2.500	5.00	25.00	50.0	100
1,2,3,4-Tetramethylbenzene	0.396	0.495	0.990	2.475	4.95	24.75	49.5	99
1,2,3,5-Tetramethylbenzene	0.392	0.490	0.980	2.450	4.90	24.50	49.0	98
1,2,3-Trichlorobenzene	0.392	0.490	0.980	2.450	4.90	24.50	49.0	98
Chloropentafluoroethane (R115)	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
2,2-Dichloro-1,1,1-trifluoroethane (R123)	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
1,1-Difluoroethane (R152a)	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
Chlorodifluoromethane (R22)	0.420	0.525	1.050	2.625	5.25	26.25	52.5	105
Dichlorofluoromethane (R21)	0.400	0.500	1.000	2.500	5.00	25.00	50.0	100
1,1,1,2-Tetrafluoroethane (R134a)	0.408	0.510	1.020	2.550	5.10	25.50	51.0	102
1-Chloro-1,1-Difluoroethane	0.408	0.510	1.020	2.550	5.10	25.50	51.0	102
Methyl Acetate	0.412	0.515	1.030	2.575	5.15	25.75	51.5	103
Methylcyclohexane	0.428	0.535	1.070	2.675	5.35	26.75	53.5	107
Chlorotrifluoroethene	0.416	0.520	1.040	2.600	5.20	26.00	52.0	104

Calibration Status Report MS09

Method : I:\MS09\Methods\ACF9010915.M (RTE Integrator)
Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
Last Update : Mon Jan 12 09:53:23 2015
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.40	0	13	I:\MS09\Data\2015_01\09\01091527.D
2	1.0	1	13	I:\MS09\Data\2015_01\09\01091528.D
3	2.5	3	13	I:\MS09\Data\2015_01\09\01091529.D
4	5.0	5	13	I:\MS09\Data\2015_01\09\01091530.D
5	25	26	13	I:\MS09\Data\2015_01\09\01091531.D
6	50	53	13	I:\MS09\Data\2015_01\09\01091532.D
7	100	105	13	I:\MS09\Data\2015_01\09\01091533.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.40	Jan 12 09:51 2015	Jan 12 09:47 2015	10 Jan 2015 1:38
2	1.0	Jan 12 09:51 2015	Jan 12 09:46 2015	10 Jan 2015 2:12
3	2.5	Jan 12 09:52 2015	Jan 12 09:45 2015	10 Jan 2015 2:45
4	5.0	Jan 12 09:52 2015	Jan 12 09:44 2015	10 Jan 2015 3:19
5	25	Jan 12 09:52 2015	Jan 12 09:43 2015	10 Jan 2015 3:52
6	50	Jan 12 09:53 2015	Jan 12 09:48 2015	10 Jan 2015 4:26
7	100	Jan 12 09:53 2015	Jan 12 09:49 2015	10 Jan 2015 4:59

ACF9010915.M Wed Jan 28 14:41:30 2015

1/28/15

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091527.D
Acq On : 10 an 2015 1:38 Operator: SC
Sample : 0.4ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-01091501 (2/7)
ALS Vial : 15 Sample Multiplier: 1

Quant Time: an 12 09:47:25 2015 1/12/15
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

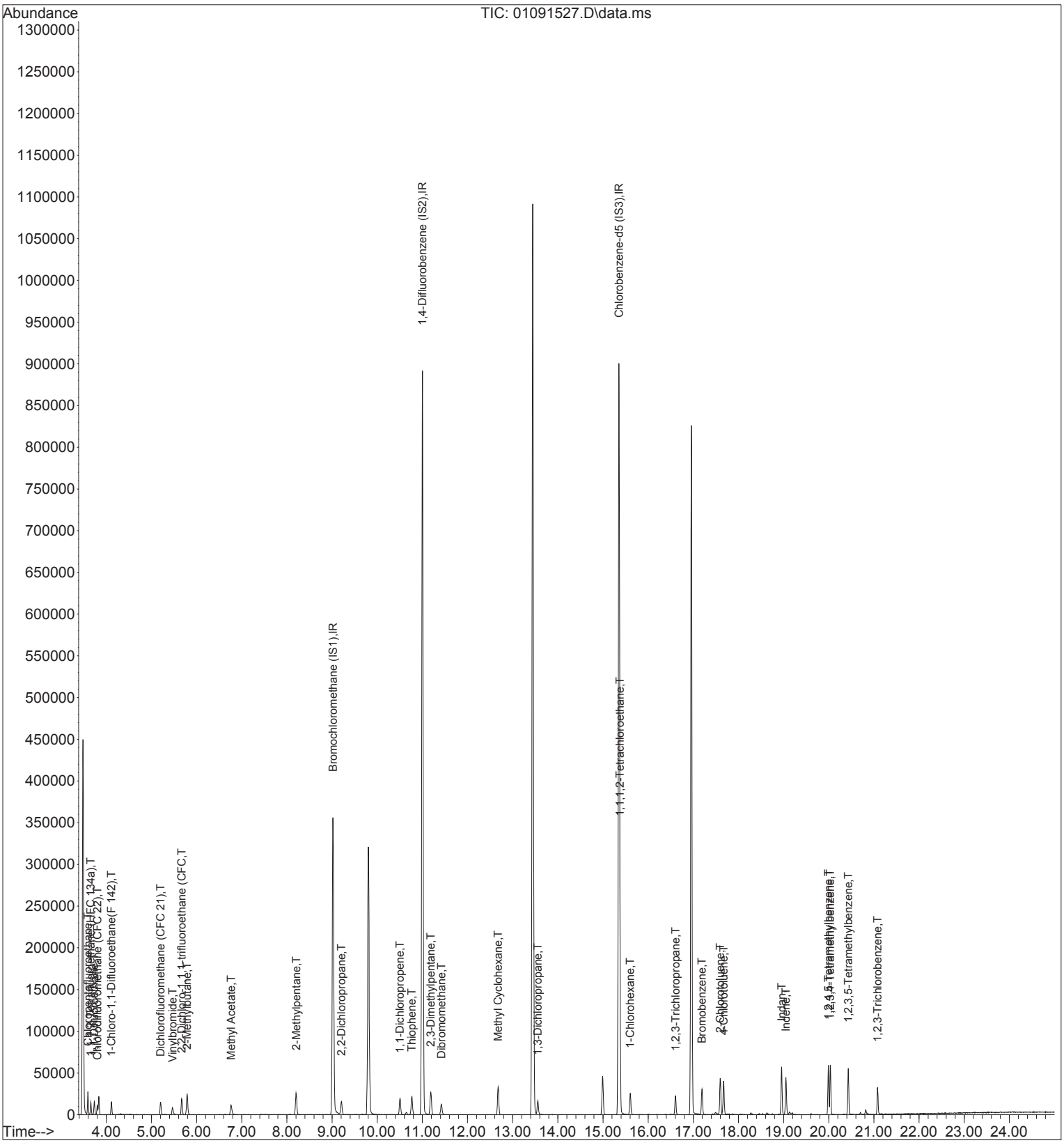
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	183446	12.500	ng	0.00
16) 1,4-Difluorobenzene (IS2)	11.00	114	934228	12.500	ng	0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	340847	12.500	ng	0.00
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.59	85	9958	0.450	ng	98
3) 1,1,1,2-Tetrafluoroeth...	3.66	83	6852	0.429	ng	95
4) 1,1-Difluoroethane	3.73	65	6616	0.413	ng	98
5) Chlorodifluoromethane ...	3.80	67	2064	0.430	ng	96
6) 1-Chloro-1,1-Difluoroe...	4.11	65	13228	0.426	ng	99
7) Dichlorofluoromethane ...	5.20	67	15676	0.408	ng	99
8) Vinylbromide	5.47	108	7407	0.469	ng	96
9) 2,2-Dichloro-1,1,1-tri...	5.67	83	12013	0.471	ng	99
10) 2-Methylbutane	5.79	57	7510	0.416	ng	97
11) Methyl Acetate	6.77	43	14599	0.385	ng	96
12) 2-Methylpentane	8.21	71	7673	0.421	ng	95
13) 2,2-Dichloropropane	9.21	77	12146	0.449	ng	99
14) 1,1-Dichloropropene	10.50	75	11701	0.445	ng	98
15) Thiophene	10.76	84	18372	0.442	ng	98
17) 2,3-Dimethylpentane	11.18	56	13652	0.416	ng	99
18) Dibromomethane	11.42	174	7177	0.563	ng	98
20) Methyl Cyclohexane	12.68	55	11278	0.528	ng	99
21) 1,3-Dichloropropane	13.56	76	12510	0.535	ng	100
22) 1,1,1,2-Tetrachloroethane	15.37	131	8655	0.621	ng	99
23) 1-Chlorohexane	15.60	91	12197	0.541	ng	94
24) 1,2,3-Trichloropropane	16.61	75	11876	0.529	ng	98
25) Bromobenzene	17.19	77	14954	0.550	ng	97
26) 2-Chlorotoluene	17.60	91	28531	0.598	ng	100
27) 4-Chlorotoluene	17.67	91	28619	0.577	ng	99
28) Indan	18.95	117	34605	0.602	ng	99
29) Indene	19.05	115	28144	0.550	ng	99
30) 1,2,4,5-Tetramethylben...	19.99	119	33245	0.553	ng	99
31) 1,2,3,4-Tetramethylben...	20.03	119	35822	0.568	ng	98
32) 1,2,3,5-Tetramethylben...	20.43	119	32359	0.533	ng	98
33) 1,2,3-Trichlorobenzene	21.08	180	12690	0.537	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091527.D
Acq On : 10 an 2015 1:38 Operator: SC
Sample : 0.4ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-01091501 (2/7)
ALS Vial : 15 Sample Multiplier: 1

Quant Time: an 12 09:47:25 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091528.D
Acq On : 10 an 2015 2:12 Operator: SC
Sample : 1.0ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-01091501 (2/7)
ALS Vial : 15 Sample Multiplier: 1

Quant Time: an 12 09:46:20 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

1/12/15

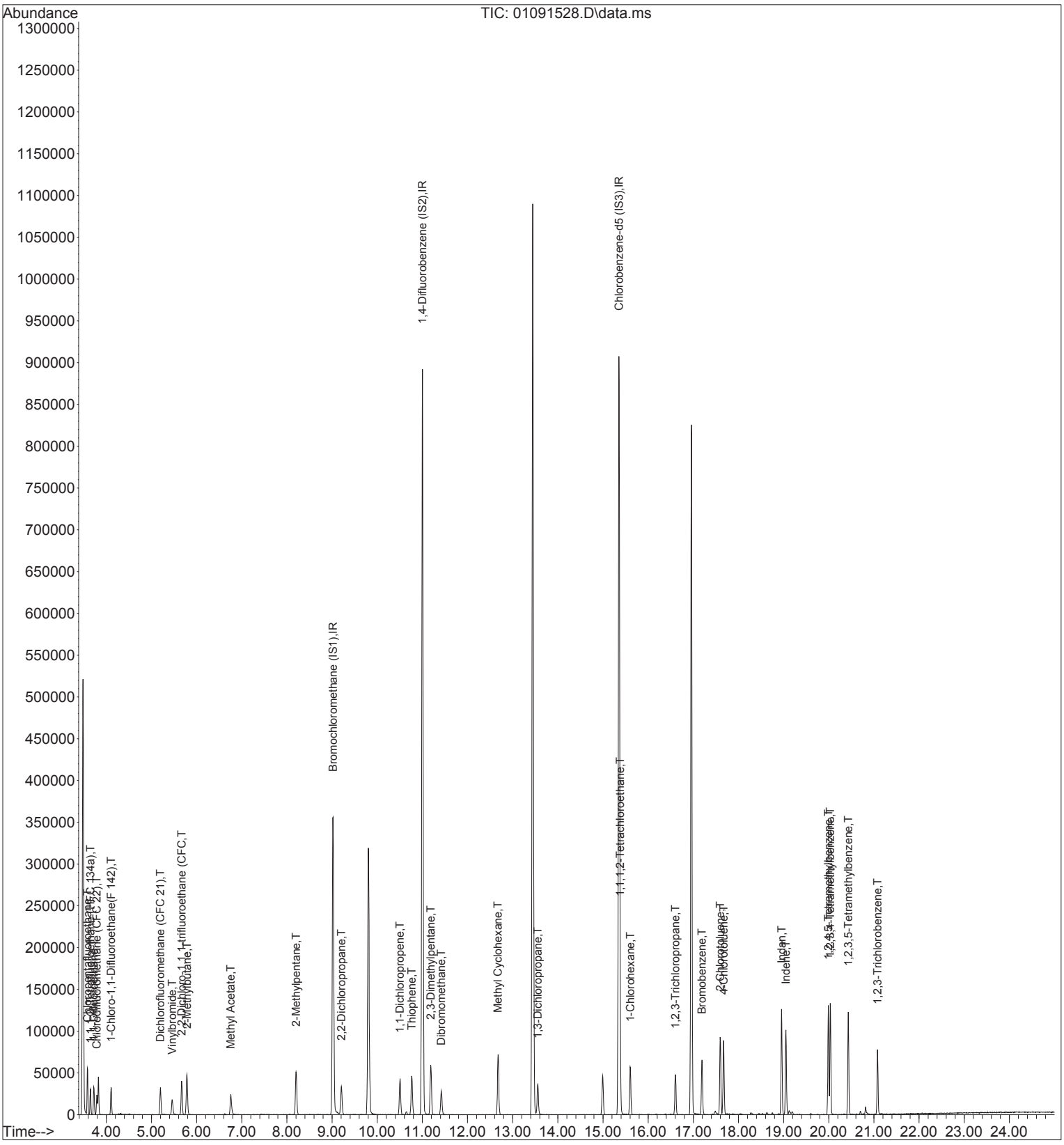
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	184032	12.500	ng	0.00
16) 1,4-Difluorobenzene (IS2)	11.00	114	928498	12.500	ng	0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	340260	12.500	ng	0.00
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.58	85	20855	0.938	ng	98
3) 1,1,1,2-Tetrafluoroeth...	3.65	83	14710	0.918	ng	99
4) 1,1-Difluoroethane	3.72	65	14404	0.897	ng	98
5) Chlorodifluoromethane ...	3.79	67	4285	0.889	ng	90
6) 1-Chloro-1,1-Difluoroe...	4.11	65	27370	0.879	ng	100
7) Dichlorofluoromethane ...	5.20	67	33393	0.867	ng	99
8) Vinylbromide	5.46	108	15619	0.986	ng	100
9) 2,2-Dichloro-1,1,1-tri...	5.67	83	24925	0.973	ng	99
10) 2-Methylbutane	5.79	57	15893	0.878	ng	98
11) Methyl Acetate	6.76	43	30886	0.812	ng	99
12) 2-Methylpentane	8.20	71	16060	0.878	ng	96
13) 2,2-Dichloropropane	9.21	77	25552	0.941	ng	99
14) 1,1-Dichloropropene	10.50	75	24567	0.932	ng	98
15) Thiophene	10.76	84	38460	0.923	ng	98
17) 2,3-Dimethylpentane	11.18	56	29260	0.898	ng	99
18) Dibromomethane	11.42	174	16015	1.265	ng	98
20) Methyl Cyclohexane	12.67	55	24269	1.138	ng	99
21) 1,3-Dichloropropane	13.56	76	27376	1.172	ng	99
22) 1,1,1,2-Tetrachloroethane	15.38	131	18921	1.359	ng	99
23) 1-Chlorohexane	15.61	91	26890	1.194	ng	98
24) 1,2,3-Trichloropropane	16.60	75	26188	1.168	ng	99
25) Bromobenzene	17.19	77	32017	1.179	ng	99
26) 2-Chlorotoluene	17.60	91	61279	1.288	ng	99
27) 4-Chlorotoluene	17.67	91	59978	1.212	ng	100
28) Indan	18.95	117	75380	1.313	ng	100
29) Indene	19.05	115	62993	1.233	ng	99
30) 1,2,4,5-Tetramethylben...	19.99	119	74952	1.250	ng	100
31) 1,2,3,4-Tetramethylben...	20.03	119	79268	1.259	ng	98
32) 1,2,3,5-Tetramethylben...	20.43	119	71838	1.184	ng	100
33) 1,2,3-Trichlorobenzene	21.08	180	28777	1.221	ng	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091528.D
Acq On : 10 an 2015 2:12 Operator: SC
Sample : 1.0ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-01091501 (2/7)
ALS Vial : 15 Sample Multiplier: 1

Quant Time: an 12 09:46:20 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091529.D
Acq On : 10 an 2015 2:45 Operator: SC
Sample : 2.5ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-01091501 (2/7)
ALS Vial : 15 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:45:37 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

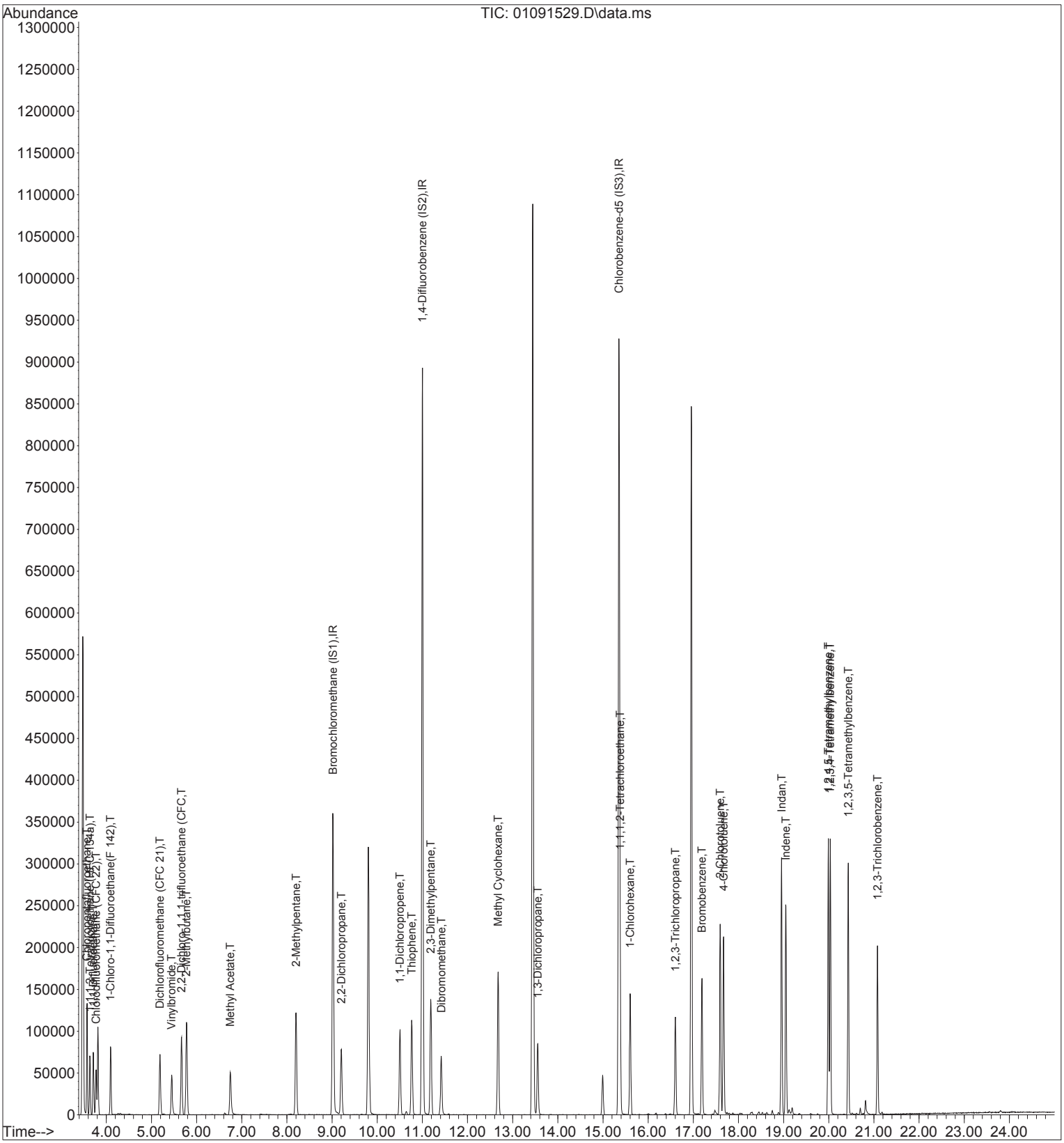
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	182651	12.500	ng	0.00
16) 1,4-Difluorobenzene (IS2)	11.00	114	930184	12.500	ng	0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	344375	12.500	ng	0.00
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.57	85	49414	2.240	ng	99
3) 1,1,1,2-Tetrafluoroeth...	3.64	83	34608	2.177	ng	99
4) 1,1-Difluoroethane	3.71	65	33602	2.108	ng	99
5) Chlorodifluoromethane ...	3.78	67	10724	2.242	ng	95
6) 1-Chloro-1,1-Difluoroe...	4.09	65	68697	2.222	ng	99
7) Dichlorofluoromethane ...	5.19	67	79075	2.067	ng	100
8) Vinylbromide	5.45	108	38223	2.431	ng	99
9) 2,2-Dichloro-1,1,1-tri...	5.66	83	59123	2.327	ng	100
10) 2-Methylbutane	5.78	57	37137	2.067	ng	98
11) Methyl Acetate	6.75	43	75027	1.988	ng	100
12) 2-Methylpentane	8.20	71	38999	2.148	ng	99
13) 2,2-Dichloropropane	9.21	77	60777	2.256	ng	100
14) 1,1-Dichloropropene	10.50	75	58799	2.248	ng	99
15) Thiophene	10.76	84	94727	2.289	ng	100
17) 2,3-Dimethylpentane	11.18	56	68334	2.093	ng	99
18) Dibromomethane	11.42	174	38181	3.011	ng	100
20) Methyl Cyclohexane	12.68	55	59069	2.737	ng	99
21) 1,3-Dichloropropane	13.56	76	64976	2.748	ng	98
22) 1,1,1,2-Tetrachloroethane	15.38	131	45616	3.237	ng	100
23) 1-Chlorohexane	15.60	91	66039	2.897	ng	99
24) 1,2,3-Trichloropropane	16.60	75	62807	2.769	ng	100
25) Bromobenzene	17.19	77	77453	2.818	ng	99
26) 2-Chlorotoluene	17.60	91	148688	3.087	ng	99
27) 4-Chlorotoluene	17.67	91	148608	2.966	ng	98
28) Indan	18.95	117	185602	3.195	ng	99
29) Indene	19.05	115	158185	3.059	ng	98
30) 1,2,4,5-Tetramethylben...	19.99	119	188415	3.104	ng	99
31) 1,2,3,4-Tetramethylben...	20.03	119	191561	3.006	ng	100
32) 1,2,3,5-Tetramethylben...	20.43	119	179859	2.930	ng	99
33) 1,2,3-Trichlorobenzene	21.08	180	71129	2.982	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091529.D
Acq On : 10 an 2015 2:45 Operator: SC
Sample : 2.5ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-01091501 (2/7)
ALS Vial : 15 Sample Multiplier: 1

Quant Time: an 12 09:45:37 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091530.D
Acq On : 10 an 2015 3:19 Operator: SC
Sample : 5.0ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-01091501 (2/7)
ALS Vial : 15 Sample Multiplier: 1

Quant Time: an 12 09:44:51 2015 1/12/15
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

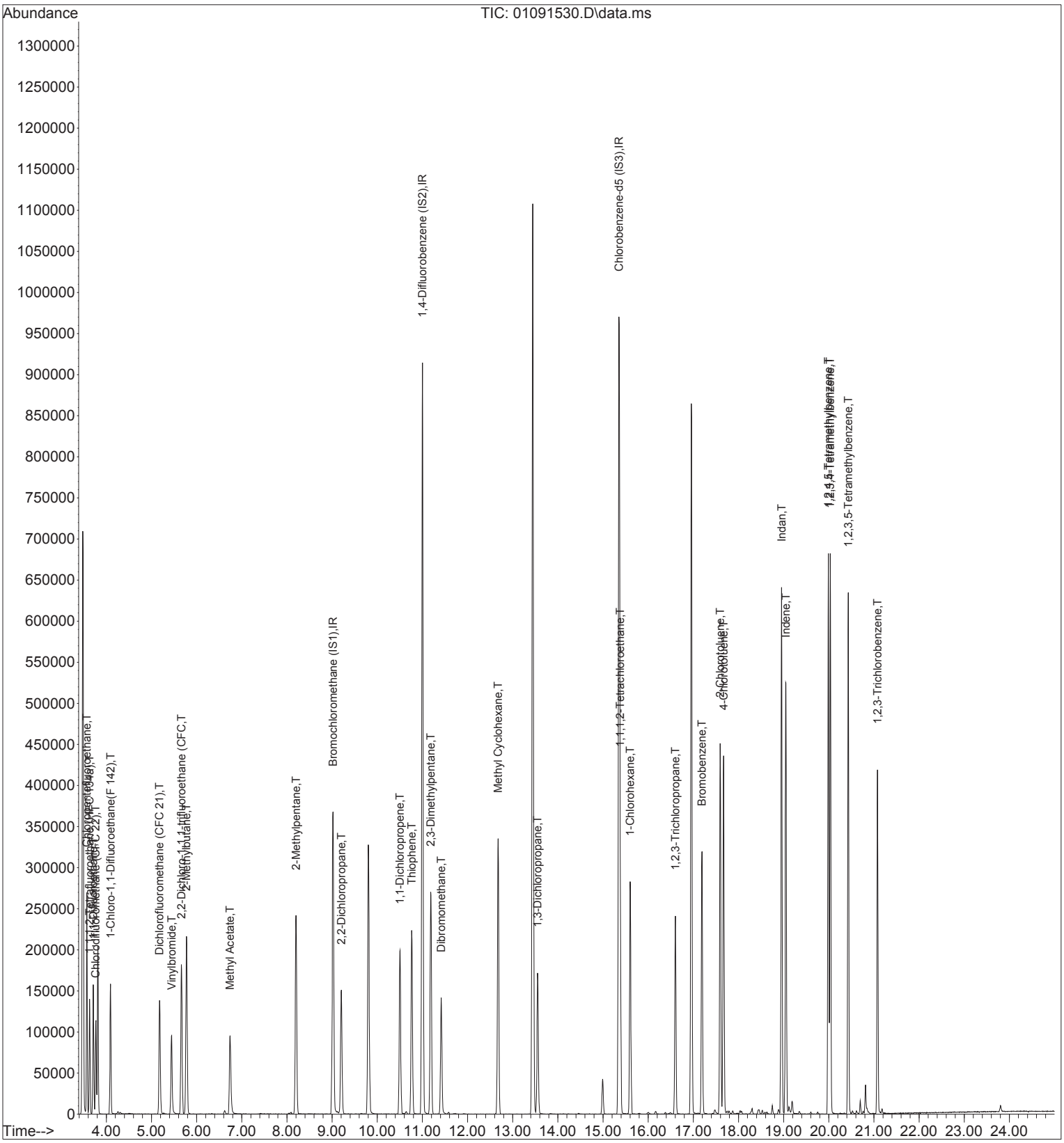
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	186330	12.500	ng	0.00
16) 1,4-Difluorobenzene (IS2)	11.00	114	949588	12.500	ng	0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	350843	12.500	ng	0.00
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.57	85	97389	4.328	ng	99
3) 1,1,1,2-Tetrafluoroeth...	3.63	83	67549	4.165	ng	99
4) 1,1-Difluoroethane	3.71	65	65837	4.049	ng	100
5) Chlorodifluoromethane ...	3.76	67	20293	4.159	ng	98
6) 1-Chloro-1,1-Difluoroe...	4.09	65	133780	4.241	ng	99
7) Dichlorofluoromethane ...	5.18	67	158922	4.073	ng	99
8) Vinylbromide	5.45	108	74511	4.646	ng	99
9) 2,2-Dichloro-1,1,1-tri...	5.66	83	118328	4.564	ng	99
10) 2-Methylbutane	5.78	57	71858	3.921	ng	100
11) Methyl Acetate	6.74	43	149488	3.882	ng	99
12) 2-Methylpentane	8.20	71	76499	4.130	ng	97
13) 2,2-Dichloropropane	9.21	77	117063	4.259	ng	99
14) 1,1-Dichloropropene	10.50	75	116525	4.367	ng	100
15) Thiophene	10.76	84	185790	4.402	ng	100
17) 2,3-Dimethylpentane	11.18	56	136021	4.081	ng	100
18) Dibromomethane	11.42	174	74895	5.785	ng	99
20) Methyl Cyclohexane	12.68	55	115276	5.242	ng	99
21) 1,3-Dichloropropane	13.55	76	129423	5.373	ng	100
22) 1,1,1,2-Tetrachloroethane	15.38	131	91302	6.360	ng	99
23) 1-Chlorohexane	15.60	91	131072	5.644	ng	99
24) 1,2,3-Trichloropropane	16.60	75	125154	5.415	ng	99
25) Bromobenzene	17.19	77	152755	5.455	ng	99
26) 2-Chlorotoluene	17.60	91	292594	5.962	ng	100
27) 4-Chlorotoluene	17.67	91	293051	5.741	ng	99
28) Indan	18.95	117	384755	6.502	ng	99
29) Indene	19.05	115	323228	6.135	ng	99
30) 1,2,4,5-Tetramethylben...	19.99	119	388597	6.284	ng	100
31) 1,2,3,4-Tetramethylben...	20.03	119	394638	6.080	ng	100
32) 1,2,3,5-Tetramethylben...	20.43	119	372062	5.949	ng	99
33) 1,2,3-Trichlorobenzene	21.08	180	149750	6.162	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091530.D
Acq On : 10 an 2015 3:19 Operator: SC
Sample : 5.0ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-01091501 (2/7)
ALS Vial : 15 Sample Multiplier: 1

Quant Time: an 12 09:44:51 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091531.D
Acq On : 10 an 2015 3:52 Operator: SC
Sample : 25ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-12301401 (1/28)
ALS Vial : 2 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:43:32 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Thu Sep 11 16:07:01 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

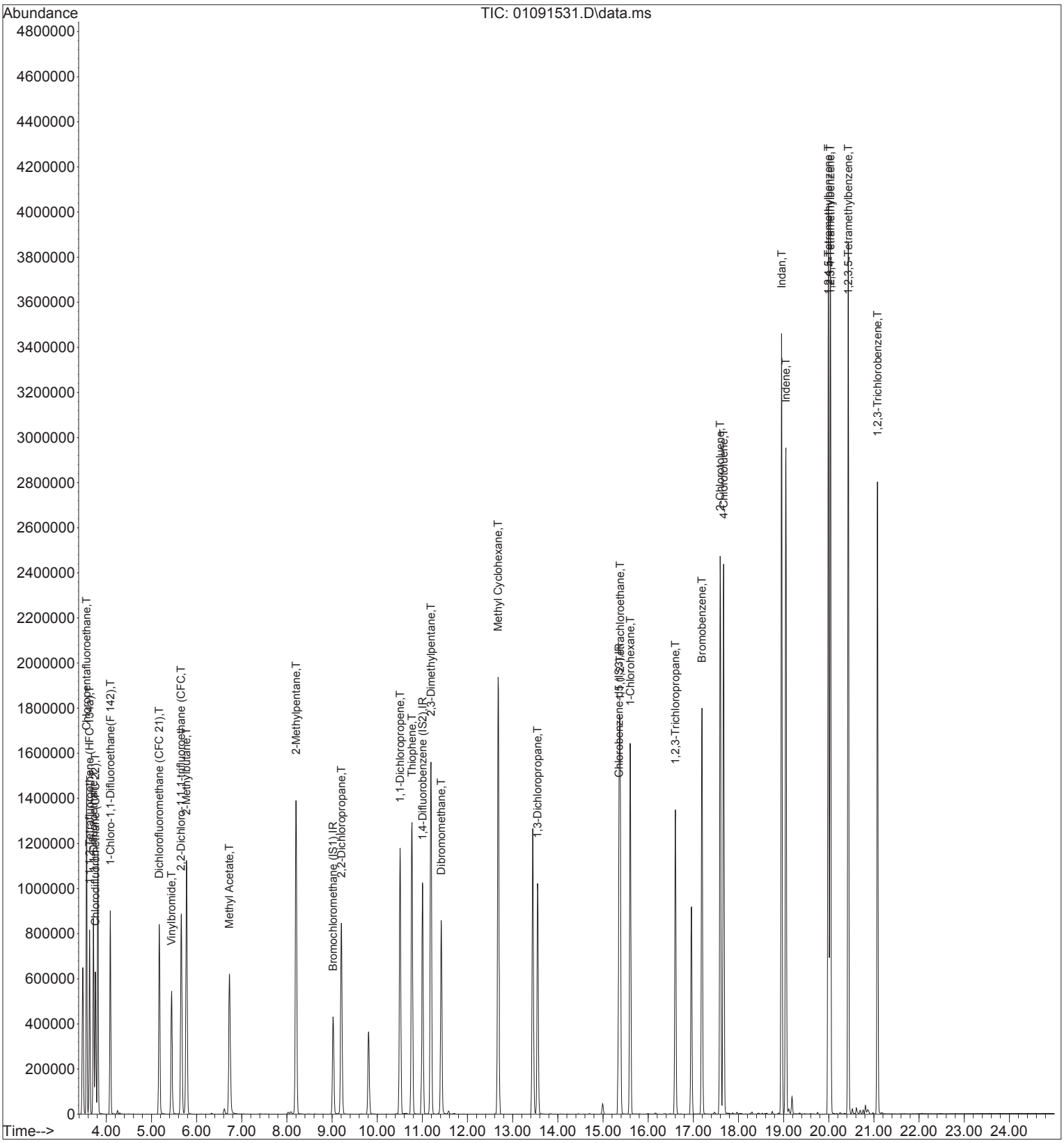
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	212941	12.500	ng		-0.03
16) 1,4-Difluorobenzene (IS2)	11.01	114	1072321	12.500	ng		-0.02
19) Chlorobenzene-d5 (IS3)	15.35	82	420919	12.500	ng		-0.02
Target Compounds							Qvalue
2) Chloropentafluoroethane	3.56	85	557653	21.687	ng		93
3) 1,1,1,2-Tetrafluoroeth...	3.63	83	379480	20.474	ng		98
4) 1,1-Difluoroethane	3.72	65	369364	19.877	ng		96
5) Chlorodifluoromethane ...	3.76	67	115515	20.715	ng		94
6) 1-Chloro-1,1-Difluoroe...	4.09	65	735732	20.411	ng		99
7) Dichlorofluoromethane ...	5.17	67	855645	19.189	ng		100
8) Vinylbromide	5.45	108	416045	22.700	ng		99
9) 2,2-Dichloro-1,1,1-tri...	5.66	83	628658	21.219	ng		99
10) 2-Methylbutane	5.78	57	380695	18.177	ng		96
11) Methyl Acetate	6.72	43	896710	20.379	ng		97
12) 2-Methylpentane	8.20	71	445636	21.051	ng		91
13) 2,2-Dichloropropane	9.21	77	674343	21.469	ng		99
14) 1,1-Dichloropropene	10.50	75	676348	22.180	ng		95
15) Thiophene	10.77	84	1083825	22.469	ng		93
17) 2,3-Dimethylpentane	11.19	56	787424	20.922	ng		98
18) Dibromomethane	11.42	174	449200	30.725	ng		82
20) Methyl Cyclohexane	12.68	55	667945	25.317	ng		90
21) 1,3-Dichloropropane	13.55	76	769807	26.636	ng		97
22) 1,1,1,2-Tetrachloroethane	15.38	131	542407	31.493	ng		99
23) 1-Chlorohexane	15.61	91	772683	27.734	ng		93
24) 1,2,3-Trichloropropane	16.60	75	698567	25.193	ng		95
25) Bromobenzene	17.19	77	848292	25.248	ng	#	79
26) 2-Chlorotoluene	17.60	91	1613494	27.406	ng		93
27) 4-Chlorotoluene	17.67	91	1633737	26.678	ng		92
28) Indan	18.95	117	2079067	29.284	ng		99
29) Indene	19.05	115	1799779	28.472	ng		99
30) 1,2,4,5-Tetramethylben...	19.99	119	2311915	31.164	ng		99
31) 1,2,3,4-Tetramethylben...	20.04	119	2349477	30.169	ng		93
32) 1,2,3,5-Tetramethylben...	20.43	119	2250898	29.996	ng		97
33) 1,2,3-Trichlorobenzene	21.08	180	997458	34.211	ng		99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091531.D
Acq On : 10 an 2015 3:52 Operator: SC
Sample : 25ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-12301401 (1/28)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: an 12 09:43:32 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Thu Sep 11 16:07:01 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091532.D
Acq On : 10 an 2015 4:26 Operator: SC
Sample : 50ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-12301401 (1/28)
ALS Vial : 2 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:48:51 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

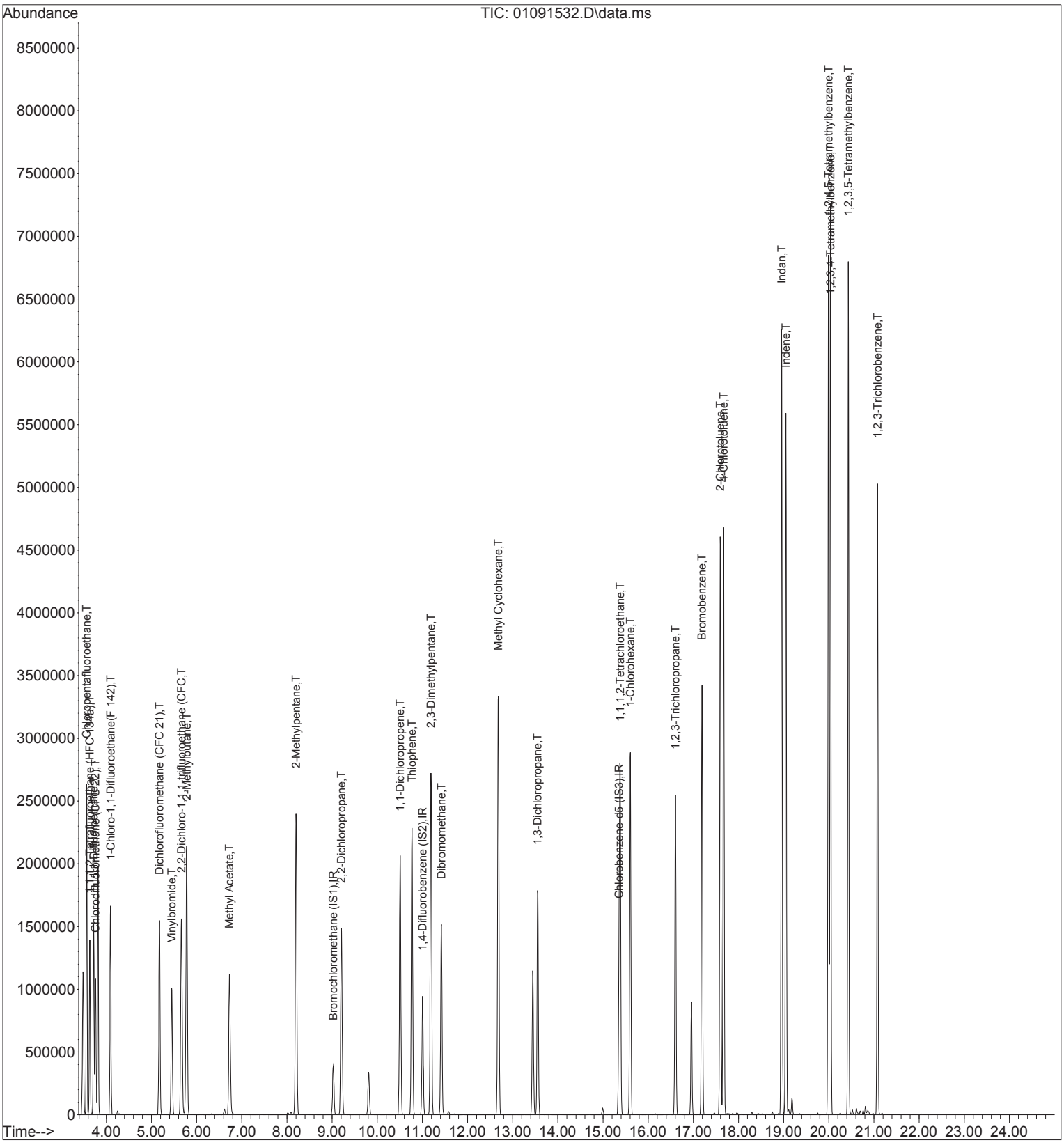
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.03	130	193639	12.500	ng	0.00
16) 1,4-Difluorobenzene (IS2)	11.01	114	978257	12.500	ng	0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	393078	12.500	ng	0.00
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.56	85	992425	42.442	ng	99
3) 1,1,1,2-Tetrafluoroeth...	3.63	83	686298	40.719	ng	97
4) 1,1-Difluoroethane	3.72	65	647977	38.345	ng	96
5) Chlorodifluoromethane ...	3.76	67	204628	40.353	ng	95
6) 1-Chloro-1,1-Difluoroe...	4.09	65	1371134	41.830	ng	99
7) Dichlorofluoromethane ...	5.18	67	1596151	39.364	ng	100
8) Vinylbromide	5.45	108	779749	46.784	ng	100
9) 2,2-Dichloro-1,1,1-tri...	5.66	83	1200857	44.573	ng	100
10) 2-Methylbutane	5.78	57	739915	38.850	ng	99
11) Methyl Acetate	6.72	43	1577089	39.414	ng	100
12) 2-Methylpentane	8.20	71	778542	40.442	ng	99
13) 2,2-Dichloropropane	9.21	77	1184802	41.480	ng	100
14) 1,1-Dichloropropene	10.50	75	1191913	42.983	ng	99
15) Thiophene	10.77	84	1907538	43.487	ng	100
17) 2,3-Dimethylpentane	11.19	56	1372955	39.988	ng	99
18) Dibromomethane	11.42	174	795180	59.619	ng	99
20) Methyl Cyclohexane	12.68	55	1166995	47.366	ng	100
21) 1,3-Dichloropropane	13.55	76	1345194	49.842	ng	99
22) 1,1,1,2-Tetrachloroethane	15.38	131	958259	59.579	ng	100
23) 1-Chlorohexane	15.61	91	1358496	52.214	ng	100
24) 1,2,3-Trichloropropane	16.60	75	1317461	50.879	ng	100
25) Bromobenzene	17.19	77	1611471	51.360	ng	100
26) 2-Chlorotoluene	17.60	91	3034482	55.192	ng	100
27) 4-Chlorotoluene	17.67	91	3097210	54.157	ng	100
28) Indan	18.95	117	3840050	57.919	ng	100
29) Indene	19.05	115	3365506	57.012	ng	100
30) 1,2,4,5-Tetramethylben...	20.00	119	4160708	60.057	ng	100
31) 1,2,3,4-Tetramethylben...	20.04	119	4009438	55.130	ng	100
32) 1,2,3,5-Tetramethylben...	20.43	119	3945574	56.304	ng	100
33) 1,2,3-Trichlorobenzene	21.08	180	1736866	63.791	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091532.D
Acq On : 10 an 2015 4:26 Operator: SC
Sample : 50ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-12301401 (1/28)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: an 12 09:48:51 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091533.D
Acq On : 10 an 2015 4:59 Operator: SC
Sample : 100ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-12301401 (1/28)
ALS Vial : 2 Sample Multiplier: 1

1/28/15

Quant Time: an 12 09:49:36 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

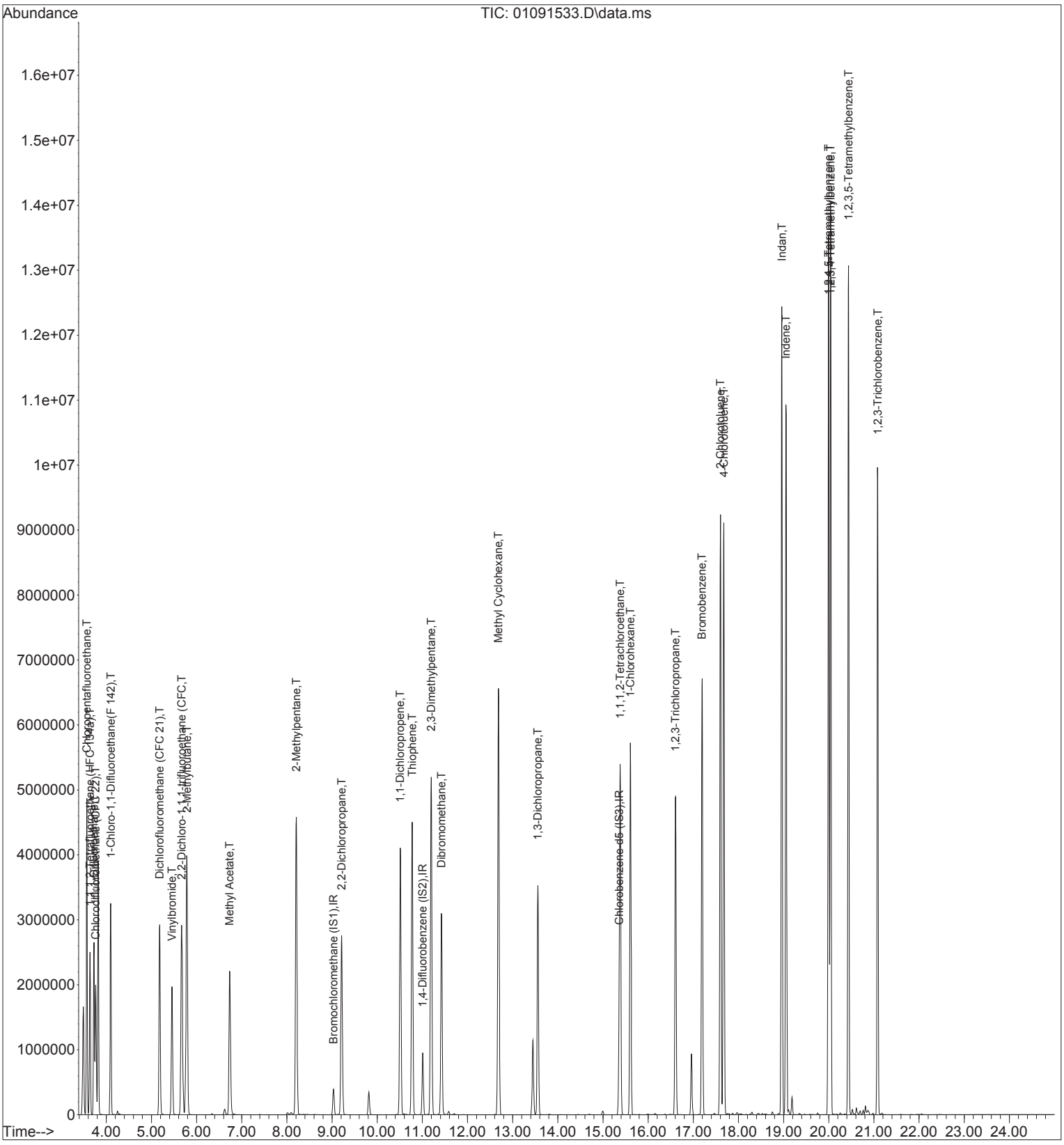
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.03	130	193933	12.500	ng	0.01
16) 1,4-Difluorobenzene (IS2)	11.01	114	985744	12.500	ng	0.00
19) Chlorobenzene-d5 (IS3)	15.36	82	433755	12.500	ng	0.00
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.57	85	1928782	82.362	ng	99
3) 1,1,1,2-Tetrafluoroeth...	3.64	83	1292498	76.569	ng	97
4) 1,1-Difluoroethane	3.73	65	1146636	67.752	ng	99
5) Chlorodifluoromethane ...	3.76	67	405429	79.829	ng	95
6) 1-Chloro-1,1-Difluoroe...	4.10	65	2702985	82.336	ng	99
7) Dichlorofluoromethane ...	5.18	67	3104677	76.451	ng	100
8) Vinylbromide	5.45	108	1531535	91.751	ng	100
9) 2,2-Dichloro-1,1,1-tri...	5.67	83	2342180	86.805	ng	100
10) 2-Methylbutane	5.79	57	1413491	74.104	ng	96
11) Methyl Acetate	6.73	43	3076853	76.779	ng	99
12) 2-Methylpentane	8.21	71	1520476	78.864	ng	97
13) 2,2-Dichloropropane	9.21	77	2218395	77.548	ng	100
14) 1,1-Dichloropropene	10.51	75	2351861	84.684	ng	99
15) Thiophene	10.77	84	3773535	85.897	ng	99
17) 2,3-Dimethylpentane	11.20	56	2666016	77.059	ng	99
18) Dibromomethane	11.42	174	1593217	118.546	ng	100
20) Methyl Cyclohexane	12.68	55	2271333	83.544	ng	99
21) 1,3-Dichloropropane	13.56	76	2647389	88.891	ng	99
22) 1,1,1,2-Tetrachloroethane	15.38	131	1913345	107.804	ng	99
23) 1-Chlorohexane	15.61	91	2683074	93.454	ng	100
24) 1,2,3-Trichloropropane	16.60	75	2604553	91.152	ng	99
25) Bromobenzene	17.19	77	3212258	92.778	ng	100
26) 2-Chlorotoluene	17.60	91	6045596	99.647	ng	99
27) 4-Chlorotoluene	17.68	91	6175471	97.857	ng	100
28) Indan	18.96	117	7598200	103.855	ng	99
29) Indene	19.05	115	6695348	102.783	ng	100
30) 1,2,4,5-Tetramethylben...	20.00	119	8089271	105.813	ng	100
31) 1,2,3,4-Tetramethylben...	20.04	119	8152245	101.581	ng	99
32) 1,2,3,5-Tetramethylben...	20.44	119	7859966	101.644	ng	100
33) 1,2,3-Trichlorobenzene	21.08	180	3526798	117.384	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091533.D
Acq On : 10 an 2015 4:59 Operator: SC
Sample : 100ng TO-15 AC F ICAL STD
Misc : S29-01081412/S29-12301401 (1/28)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: an 12 09:49:36 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:44:35 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091535.D
Acq On : 10 an 2015 6:06 Operator: SC
Sample : 25ng TO-15 AC F ICV STD
Misc : S29-01081412/S29-01091505 (2/7)
ALS Vial : 16 Sample Multiplier: 1

1/12/15

Quant Time: an 12 09:54:23 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

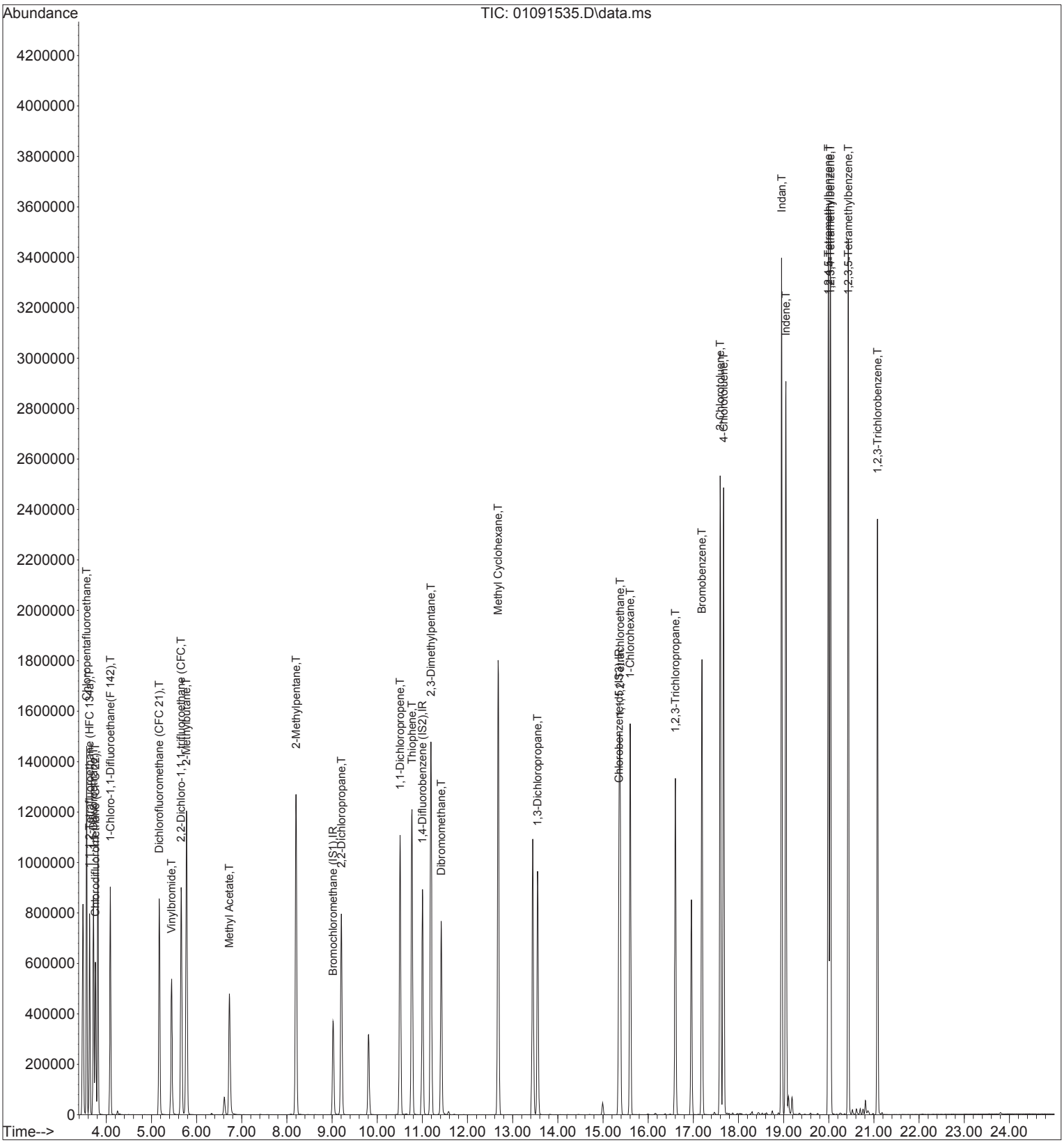
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.02	130	185723	12.500	ng	-0.01
16) 1,4-Difluorobenzene (IS2)	11.00	114	926155	12.500	ng	0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	357332	12.500	ng	0.00
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.56	85	540621	27.840	ng	100
3) 1,1,1,2-Tetrafluoroeth...	3.63	83	377568	27.366	ng	98
4) 1,1-Difluoroethane	3.72	65	365266	28.449	ng	100
5) Chlorodifluoromethane ...	3.76	67	111440	27.492	ng	99
6) 1-Chloro-1,1-Difluoroe...	4.09	65	737592	27.207	ng	100
7) Dichlorofluoromethane ...	5.17	67	867418	26.699	ng	100
8) Vinylbromide	5.45	108	409357	26.540	ng	99
9) 2,2-Dichloro-1,1,1-tri...	5.66	83	629159	27.107	ng	99
10) 2-Methylbutane	5.78	57	408599	27.385	ng	99
11) Methyl Acetate	6.72	43	735670	24.172	ng	100
12) 2-Methylpentane	8.20	71	407260	25.248	ng	99
13) 2,2-Dichloropropane	9.21	77	631014	26.182	ng	100
14) 1,1-Dichloropropene	10.50	75	627676	26.537	ng	99
15) Thiophene	10.77	84	1014658	26.430	ng	100
17) 2,3-Dimethylpentane	11.19	56	740133	27.363	ng	99
18) Dibromomethane	11.42	174	397869	27.564	ng	99
20) Methyl Cyclohexane	12.68	55	621713	28.111	ng	100
21) 1,3-Dichloropropane	13.55	76	715927	28.098	ng	99
22) 1,1,1,2-Tetrachloroethane	15.38	131	466593	26.290	ng	100
23) 1-Chlorohexane	15.60	91	721936	27.512	ng	100
24) 1,2,3-Trichloropropane	16.60	75	691717	28.622	ng	99
25) Bromobenzene	17.19	77	849650	28.842	ng	99
26) 2-Chlorotoluene	17.60	91	1647035	29.906	ng	100
27) 4-Chlorotoluene	17.67	91	1638815	28.541	ng	100
28) Indan	18.95	117	2018332	27.279	ng	100
29) Indene	19.05	115	1776176	27.422	ng	99
30) 1,2,4,5-Tetramethylben...	19.99	119	2079847	26.763	ng	100
31) 1,2,3,4-Tetramethylben...	20.04	119	2125530	26.452	ng	100
32) 1,2,3,5-Tetramethylben...	20.43	119	2016958	26.425	ng	100
33) 1,2,3-Trichlorobenzene	21.08	180	823374	25.909	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_01\09\01091535.D
Acq On : 10 an 2015 6:06 Operator: SC
Sample : 25ng TO-15 AC F ICV STD
Misc : S29-01081412/S29-01091505 (2/7)
ALS Vial : 16 Sample Multiplier: 1

Quant Time: an 12 09:54:23 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



LABORATORY CONTROL SAMPLE CHECK SHEET

1/12/15

Data File Name: **01091535.D**
Data File Path: **I:\MS09\Data\2015_01\09**
Operator: **SC**
Date Acquired: **1/10/15** **6:06**

Acq. Method File: **TO15.M**
Sample Name: **25ng TO-15 AC&F IC**
Misc Info: **S29-01081412/S29-01**
Instrument Name: **MS09**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	AZ Check 70-130%
2)	**Chloropentafluoroethane**	3.56	27.8	26.75	104	70	130	*
3)	**1,1,1,2-Tetrafluoroethane (HFC 1**	3.63	27.4	26.00	105	70	130	*
4)	**1,1-Difluoroethane**	3.72	28.4	26.75	106	70	130	*
5)	**Chlorodifluoromethane (CFC 22)**	3.76	27.5	26.75	103	70	130	*
6)	**1-Chloro-1,1-Difluoroethane(F 14**	4.09	27.2	25.25	108	70	130	*
7)	**Dichlorofluoromethane (CFC 21)**	5.17	26.7	25.75	104	70	130	*
8)	**Vinylbromide**	5.45	26.5	25.25	105	70	130	*
9)	**2,2-Dichloro-1,1,1-trifluoroethane**	5.66	27.1	26.50	102	70	130	*
10)	**2-Methylbutane**	5.78	27.4	26.50	103	70	130	*
11)	**Methyl Acetate**	6.72	24.2	23.00	105	70	130	*
12)	**2-Methylpentane**	8.20	25.2	24.50	103	70	130	*
13)	**2,2-Dichloropropane**	9.21	26.2	25.25	104	70	130	*
14)	**1,1-Dichloropropene**	10.50	26.5	25.75	103	70	130	*
15)	**Thiophene**	10.77	26.4	25.50	104	70	130	*
17)	**2,3-Dimethylpentane**	11.19	27.4	26.00	105	70	130	*
18)	**Dibromomethane**	11.42	27.6	26.00	106	70	130	*
20)	**Methyl Cyclohexane**	12.68	28.1	26.75	105	70	130	*
21)	**1,3-Dichloropropane**	13.55	28.1	26.50	106	70	130	*
22)	**1,1,1,2-Tetrachloroethane**	15.38	26.3	25.00	105	70	130	*
23)	**1-Chlorohexane**	15.60	27.5	26.00	106	70	130	*
24)	**1,2,3-Trichloropropane**	16.60	28.6	26.50	108	70	130	*
25)	**Bromobenzene**	17.19	28.8	26.75	108	70	130	*
26)	**2-Chlorotoluene**	17.60	29.9	27.50	109	70	130	*
27)	**4-Chlorotoluene**	17.67	28.5	26.75	107	70	130	*
28)	**Indan**	18.95	27.3	25.75	106	70	130	*
29)	**Indene**	19.05	27.4	25.50	107	70	130	*
30)	**1,2,4,5-Tetramethylbenzene**	19.99	26.8	25.75	104	70	130	*
31)	**1,2,3,4-Tetramethylbenzene**	20.04	26.5	25.75	103	70	130	*
32)	**1,2,3,5-Tetramethylbenzene**	20.43	26.4	25.50	104	70	130	*
33)	**1,2,3-Trichlorobenzene**	21.08	25.9	25.50	102	70	130	*

* = Pass

Evaluate Continuing Calibration Report

Data File: I:\MS09\Data\2015_02\13\02131501.D
Acq On : 13 Feb 2015 5:40 Operator: SC
Sample : CCV R9021315_25ng
Misc : S29-01081512/S29-02031502 (3/4)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 13 08:55:24 2015 2/13/15
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	75	0.00
2	T	Propene	1.051	0.800	23.9	60	0.00
3	T	Dichlorodifluoromethane (CF	2.439	1.973	19.1	64	0.00
4	T	Chloromethane	1.566	1.171	25.2	57	0.00
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.443	1.212	16.0	68	0.00
6	T	Vinyl Chloride	1.744	1.448	17.0	66	0.00
7	T	1,3-Butadiene	1.123	0.880	21.6	58	0.00
8	T	Bromomethane	1.239	1.005	18.9	62	0.00
9	T	Chloroethane	0.878	0.704	19.8	61	0.00
10	T	Ethanol	0.789	0.627	20.5	60	0.00
11	T	Acetonitrile	1.865	1.514	18.8	62	0.00
12	T	Acrolein	0.613	0.500	18.4	61	0.00
13	T	Acetone	0.831	0.649	21.9	64	0.00
14	T	Trichlorofluoromethane	1.964	1.587	19.2	64	0.00
15	T	2-Propanol (Isopropanol)	2.591	2.199	15.1	62	0.00
16	T	Acrylonitrile	1.328	1.220	8.1	63	0.00
17	T	1,1-Dichloroethene	1.213	1.024	15.6	65	0.00
18	T	2-Methyl-2-Propanol (tert-B	2.800	2.291	18.2	60	0.00
19	T	Methylene Chloride	1.320	1.009	23.6	65	0.00
20	T	3-Chloro-1-propene (Allyl C	1.434	1.171	18.3	61	0.00
21	T	Trichlorotrifluoroethane	1.126	0.915	18.7	66	0.00
22	T	Carbon Disulfide	4.185	3.573	14.6	65	0.00
23	T	trans-1,2-Dichloroethene	1.583	1.342	15.2	63	0.00
24	T	1,1-Dichloroethane	2.049	1.679	18.1	63	0.00
25	T	Methyl tert-Butyl Ether	3.534	2.932	17.0	63	0.00
26	T	Vinyl Acetate	0.270	0.258	4.4	65	0.00
27	T	2-Butanone (MEK)	0.757	0.676	10.7	64	0.00
28	T	cis-1,2-Dichloroethene	1.641	1.273	22.4	63	0.00
29	T	Diisopropyl Ether	1.139	0.876	23.1	65	0.00
30	T	Ethyl Acetate	0.410	0.360	12.2	65	0.00
31	T	n-Hexane	1.894	1.559	17.7	64	0.00
32	T	Chloroform	2.042	1.679	17.8	64	0.00
33	S	1,2-Dichloroethane-d4(SS1)	1.378	1.285	6.7	72	0.00
34	T	Tetrahydrofuran (THF)	0.796	0.658	17.3	63	0.00
35	T	Ethyl tert-Butyl Ether	1.512	1.266	16.3	64	0.00
36	T	1,2-Dichloroethane	1.439	1.156	19.7	62	0.00
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	75	0.00
38	T	1,1,1-Trichloroethane	0.369	0.312	15.4	64	0.00
39	T	Isopropyl Acetate	0.129	0.115	10.9	64	0.00
40	T	1-Butanol	0.207	0.187	9.7	60	0.00
41	T	Benzene	1.043	0.799	23.4	65	0.00
42	T	Carbon Tetrachloride	0.312	0.263	15.7	64	0.00
43	T	Cyclohexane	0.379	0.324	14.5	65	0.00
44	T	tert-Amyl Methyl Ether	0.677	0.584	13.7	64	0.00
45	T	1,2-Dichloropropane	0.231	0.196	15.2	64	0.00
46	T	Bromodichloromethane	0.317	0.273	13.9	64	0.00
47	T	Trichloroethene	0.299	0.255	14.7	66	0.00
48	T	1,4-Dioxane	0.199	0.182	8.5	64	0.00
49	T	2,2,4-Trimethylpentane (Iso	0.964	0.802	16.8	63	0.00
50	T	Methyl Methacrylate	0.101	0.096	5.0	65	0.00
51	T	n-Heptane	0.237	0.204	13.9	64	0.00
52	T	cis-1,3-Dichloropropene	0.362	0.328	9.4	64	0.00
53	T	4-Methyl-2-pentanone	0.193	0.177	8.3	63	0.00
54	T	trans-1,3-Dichloropropene	0.312	0.295	5.4	64	0.00

Evaluate Continuing Calibration Report

Data File: I:\MS09\Data\2015_02\13\02131501.D
Acq On : 13 Feb 2015 5:40 Operator: SC
Sample : CCV R9021315_25ng
Misc : S29-01081512/S29-02031502 (3/4)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 13 08:55:24 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
55	T	1,1,2-Trichloroethane	0.245	0.217	11.4	66	0.00
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	76	0.00
57	S	Toluene-d8 (SS2)	2.575	2.520	2.1	75	0.00
58	T	Toluene	2.894	2.402	17.0	65	0.00
59	T	2-Hexanone	1.168	1.030	11.8	62	0.00
60	T	Dibromochloromethane	0.791	0.705	10.9	66	0.00
61	T	1,2-Dibromoethane	0.754	0.665	11.8	66	0.00
62	T	n-Butyl Acetate	1.244	1.094	12.1	62	0.00
63	T	n-Octane	0.530	0.447	15.7	64	0.00
64	T	Tetrachloroethene	0.945	0.813	14.0	67	0.00
65	T	Chlorobenzene	1.953	1.658	15.1	66	0.00
66	T	Ethylbenzene	3.190	2.687	15.8	65	0.00
67	T	m- p- ylenes	2.577	2.174	15.6	65	0.00
68	T	Bromoform	0.674	0.627	7.0	66	0.00
69	T	Styrene	2.021	1.767	12.6	64	0.00
70	T	o- ylene	2.644	2.236	15.4	65	0.00
71	T	n-Nonane	1.170	0.961	17.9	63	0.00
72	T	1,1,2,2-Tetrachloroethane	1.190	1.058	11.1	66	0.00
73	S	Bromofluorobenzene (SS3)	0.965	1.061	-9.9	83	0.00
74	T	Cumene	3.492	2.958	15.3	65	0.00
75	T	alpha-Pinene	1.675	1.432	14.5	65	0.00
76	T	n-Propylbenzene	4.092	3.516	14.1	65	0.00
77	T	3-Ethyltoluene	3.346	2.818	15.8	65	0.00
78	T	4-Ethyltoluene	3.248	2.888	11.1	65	0.00
79	T	1,3,5-Trimethylbenzene	2.860	2.433	14.9	65	0.00
80	T	alpha-Methylstyrene	1.546	1.368	11.5	64	0.00
81	T	2-Ethyltoluene	3.284	2.809	14.5	65	0.00
82	T	1,2,4-Trimethylbenzene	2.806	2.451	12.7	65	0.00
83	T	n-Decane	1.329	1.104	16.9	63	0.00
84	T	Benzyl Chloride	2.136	2.072	3.0	64	0.00
85	T	1,3-Dichlorobenzene	1.726	1.512	12.4	66	0.00
86	T	1,4-Dichlorobenzene	1.867	1.608	13.9	67	0.00
87	T	sec-Butylbenzene	3.714	3.235	12.9	66	0.00
88	T	4-Isopropyltoluene (p-Cymen	3.557	3.133	11.9	66	0.00
89	T	1,2,3-Trimethylbenzene	2.963	2.608	12.0	66	0.00
90	T	1,2-Dichlorobenzene	1.708	1.481	13.3	66	0.00
91	T	d-Limonene	0.973	0.860	11.6	63	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.579	0.565	2.4	67	0.00
93	T	n-Undecane	1.388	1.144	17.6	61	0.00
94	T	1,2,4-Trichlorobenzene	1.317	1.168	11.3	66	0.00
95	T	Naphthalene	4.089	3.547	13.3	63	0.00
96	T	n-Dodecane	1.305	1.068	18.2	60	0.00
97	T	Hexachlorobutadiene	0.815	0.697	14.5	66	0.00
98	T	Cyclohexanone	0.776	0.649	16.4	60	0.00
99	T	tert-Butylbenzene	2.813	2.433	13.5	66	0.00
100	T	n-Butylbenzene	2.812	2.457	12.6	65	0.00

(#) = Out of Range SPCC s out = 0 CCC s out = 0

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131501.D
Acq On : 13 Feb 2015 5:40 Operator: SC
Sample : CCV R9021315_25ng
Misc : S29-01081512/S29-02031502 (3/4)
ALS Vial : 2 Sample Multiplier: 1

2/13/15

Quant Time: Feb 13 08:55:24 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	9.04	130	150973	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	11.01	114	760775	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	15.36	82	285749	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	9.82	65	194053	11.657	ng		0.00
Spiked Amount 12.500			Recovery = 93.28%				
57) Toluene-d8 (SS2)	13.45	98	720190	12.233	ng		0.00
Spiked Amount 12.500			Recovery = 97.84%				
73) Bromofluorobenzene (SS3)	16.96	174	303193	13.739	ng		0.00
Spiked Amount 12.500			Recovery = 109.92%				
Target Compounds							Qvalue
2) Propene	3.79	42	239245	18.851	ng		99
3) Dichlorodifluoromethan...	3.90	85	566013	19.214	ng		100
4) Chloromethane	4.09	50	357017	18.876	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.25	135	373190	21.408	ng		100
6) Vinyl Chloride	4.37	62	437250	20.762	ng		100
7) 1,3-Butadiene	4.55	54	276253	20.371	ng		98
8) Bromomethane	4.85	94	309444	20.681	ng		99
9) Chloroethane	5.06	64	214700	20.251	ng		100
10) Ethanol	5.27	45	977072	102.482	ng		100
11) Acetonitrile	5.47	41	484603	21.510	ng		100
12) Acrolein	5.60	56	170735	23.063	ng		99
13) Acetone	5.74	58	1070503	106.706	ng		95
14) Trichlorofluoromethane	5.93	101	517406	21.810	ng		100
15) 2-Propanol (Isopropanol)	6.06	45	1420611	45.389	ng		99
16) Acrylonitrile	6.27	53	390578	24.352	ng		100
17) 1,1-Dichloroethene	6.62	96	337144	23.019	ng		96
18) 2-Methyl-2-Propanol (t...	6.71	59	1480463	43.774	ng		100
19) Methylene Chloride	6.77	84	344179	21.596	ng		96
20) 3-Chloro-1-propene (Al...	6.89	41	385267	22.247	ng		98
21) Trichlorotrifluoroethane	7.08	151	301260	22.147	ng		98
22) Carbon Disulfide	7.04	76	1132706	22.408	ng		100
23) trans-1,2-Dichloroethene	7.79	61	429523	22.472	ng		97
24) 1,1-Dichloroethane	8.00	63	542589	21.920	ng		99
25) Methyl tert-Butyl Ether	8.06	73	965020	22.608	ng		100
26) Vinyl Acetate	8.18	86	408493	125.461	ng	#	93
27) 2-Butanone (MEK)	8.41	72	226541	24.771	ng		97
28) cis-1,2-Dichloroethene	8.88	61	422951	21.343	ng		97
29) Diisopropyl Ether	9.11	87	290860	21.136	ng	#	94
30) Ethyl Acetate	9.11	61	232725	46.993	ng		97
31) n-Hexane	9.12	57	503703	22.022	ng		100
32) Chloroform	9.18	83	567821	23.021	ng		99
34) Tetrahydrofuran (THF)	9.56	72	220381	22.922	ng		98
35) Ethyl tert-Butyl Ether	9.66	87	412969	22.612	ng		98
36) 1,2-Dichloroethane	9.93	62	376873	21.684	ng		100
38) 1,1,1-Trichloroethane	10.19	97	498120	22.168	ng		99
39) Isopropyl Acetate	10.56	61	400921	51.021	ng		95
40) 1-Butanol	10.57	56	649837	51.534	ng		100
41) Benzene	10.65	78	1372919	21.623	ng		100
42) Carbon Tetrachloride	10.81	117	460626	24.246	ng		100
43) Cyclohexane	10.94	84	1055430	45.745	ng		98
44) tert-Amyl Methyl Ether	11.25	73	950509	23.056	ng		99
45) 1,2-Dichloropropane	11.47	63	324675	23.069	ng		99
46) Bromodichloromethane	11.65	83	452094	23.467	ng		100
47) Trichloroethene	11.71	130	419834	23.066	ng		100
48) 1,4-Dioxane	11.67	88	301313	24.914	ng		98
49) 2,2,4-Trimethylpentane...	11.77	57	1305663	22.244	ng		99

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131501.D
Acq On : 13 Feb 2015 5:40 Operator: SC
Sample : CCV R9021315_25ng
Misc : S29-01081512/S29-02031502 (3/4)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 13 08:55:24 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

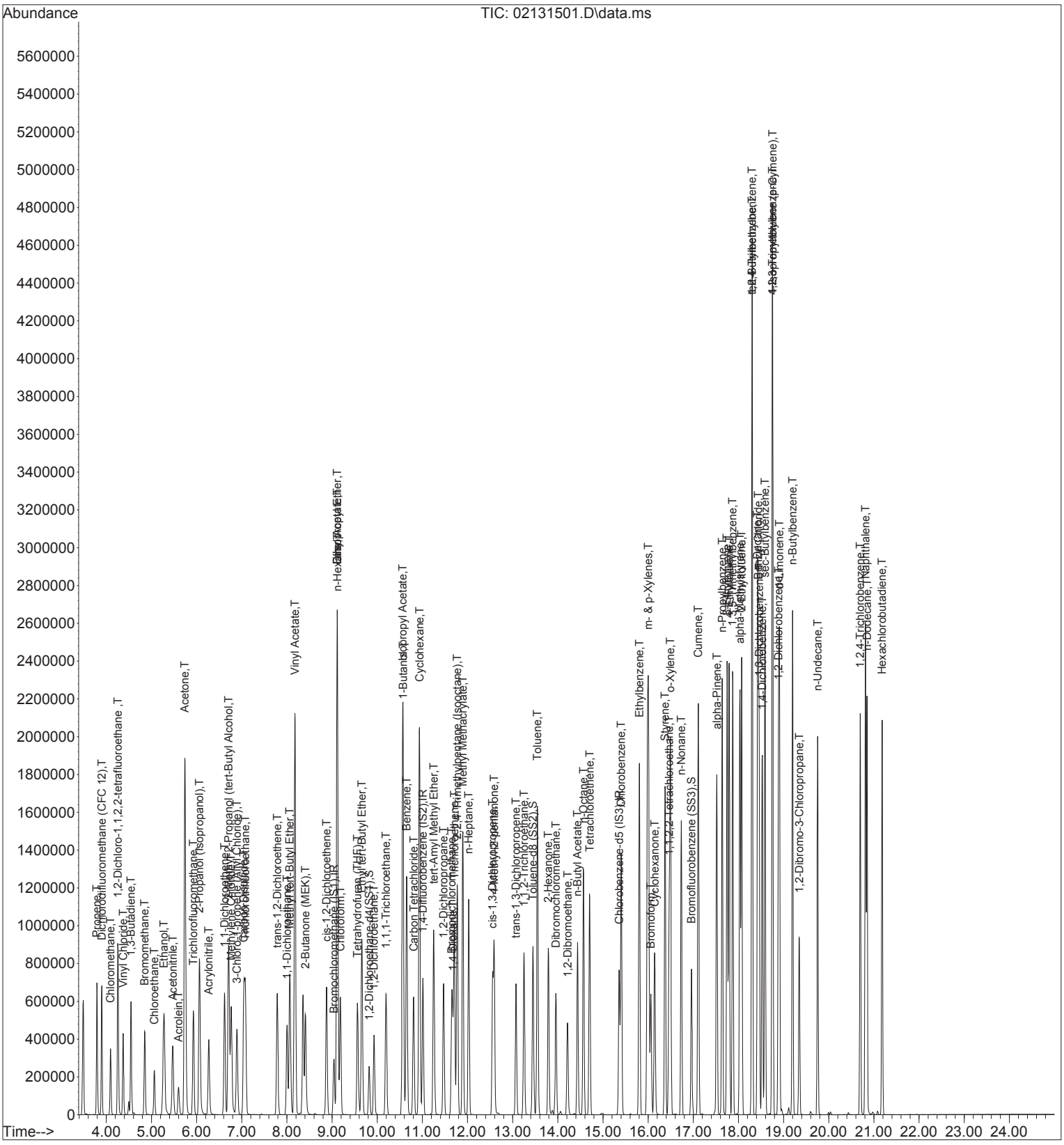
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
50) Methyl Methacrylate	11.90	100	312067	50.634	ng	98
51) n-Heptane	12.03	71	338276	23.430	ng	100
52) cis-1,3-Dichloropropene	12.55	75	523794	23.803	ng	100
53) 4-Methyl-2-pentanone	12.59	58	298938	25.444	ng	99
54) trans-1,3-Dichloropropene	13.07	75	476424	25.105	ng	100
55) 1,1,2-Trichloroethane	13.25	97	360661	24.176	ng	99
58) Toluene	13.55	91	1509989	22.821	ng	100
59) 2-Hexanone	13.79	43	647563	24.248	ng	99
60) Dibromochloromethane	13.96	129	443220	24.497	ng	100
61) 1,2-Dibromoethane	14.21	107	418041	24.264	ng	100
62) n-Butyl Acetate	14.44	43	725376	25.505	ng	99
63) n-Octane	14.57	57	270727	22.334	ng	98
64) Tetrachloroethene	14.71	166	469264	21.721	ng	100
65) Chlorobenzene	15.40	112	1051657	23.550	ng	100
66) Ethylbenzene	15.81	91	1689212	23.163	ng	100
67) m- p- ylenes	16.00	91	2683341	45.542	ng	99
68) Bromoform	16.06	173	408299	26.486	ng	100
69) Styrene	16.37	104	1131027	24.477	ng	100
70) o- ylene	16.49	91	1354282	22.405	ng	99
71) n-Nonane	16.73	43	571244	21.359	ng	99
72) 1,1,2,2-Tetrachloroethane	16.46	83	635040	23.346	ng	99
74) Cumene	17.11	105	1758352	22.030	ng	99
75) alpha-Pinene	17.52	93	875511	22.861	ng	99
76) n-Propylbenzene	17.64	91	2069873	22.128	ng	100
77) 3-Ethyltoluene	17.75	105	1739026	22.736	ng	96
78) 4-Ethyltoluene	17.80	105	1782436	24.010	ng	97
79) 1,3,5-Trimethylbenzene	17.87	105	1487864	22.757	ng	99
80) alpha-Methylstyrene	18.03	118	844206	23.885	ng	100
81) 2-Ethyltoluene	18.07	105	1734027	23.097	ng	99
82) 1,2,4-Trimethylbenzene	18.30	105	1527104	23.810	ng	99
83) n-Decane	18.42	57	668765	22.008	ng	99
84) Benzyl Chloride	18.44	91	1349722	27.645	ng	99
85) 1,3-Dichlorobenzene	18.46	146	984919	24.963	ng	100
86) 1,4-Dichlorobenzene	18.53	146	974308	22.831	ng	99
87) sec-Butylbenzene	18.59	105	2015043	23.731	ng	99
88) 4-Isopropyltoluene (p-...	18.75	119	1916104	23.563	ng	99
89) 1,2,3-Trimethylbenzene	18.75	105	1579687	23.325	ng	99
90) 1,2-Dichlorobenzene	18.88	146	939731	24.070	ng	100
91) d-Limonene	18.91	68	526016	23.647	ng	99
92) 1,2-Dibromo-3-Chloropr...	19.35	157	355113	26.844	ng	95
93) n-Undecane	19.75	57	679652	21.420	ng	100
94) 1,2,4-Trichlorobenzene	20.70	180	754383	25.052	ng	100
95) Naphthalene	20.81	128	2249860	24.071	ng	100
96) n-Dodecane	20.85	57	689693	23.115	ng	99
97) Hexachlorobutadiene	21.18	225	446350	23.966	ng	100
98) Cyclohexanone	16.15	55	437481	24.649	ng	98
99) tert-Butylbenzene	18.30	119	1501717	23.356	ng	100
100) n-Butylbenzene	19.20	91	1572366	24.457	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131501.D
Acq On : 13 Feb 2015 5:40 Operator: SC
Sample : CCV R9021315_25ng
Misc : S29-01081512/S29-02031502 (3/4)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 13 08:55:24 2015
Quant Method : I:\MS09\Methods\R9010915.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon an 12 09:19:02 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M



Evaluate Continuing Calibration Report

Data File: I:\MS09\Data\2015_02\13\02131502.D
Acq On : 13 Feb 2015 6:14 Operator: SC
Sample : CCV C9021315_25ng
Misc : S29-01081512/S29-01291503 (2/27)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 13 15:01:23 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

2/13/15

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	75	0.00
2	T	Chloropentafluoroethane	1.307	1.188	9.1	71	0.00
3	T	1,1,1,2-Tetrafluoroethane (	0.929	0.816	12.2	70	0.00
4	T	1,1-Difluoroethane	0.864	0.787	8.9	71	0.00
5	T	Chlorodifluoromethane (CFC	0.273	0.235	13.9	68	0.00
6	T	1-Chloro-1,1-Difluoroethane	1.825	1.555	14.8	69	0.00
7	T	Dichlorofluoromethane (CFC	2.187	1.960	10.4	73	0.00
8	T	Vinylbromide	1.038	0.938	9.6	73	0.00
9	T	2,2-Dichloro-1,1,1-trifluor	1.562	1.369	12.4	73	0.00
10	T	2-Methylbutane	1.004	0.923	8.1	78	0.00
11	T	Methyl Acetate	2.048	1.633	20.3	60	0.00
12	T	2-Methylpentane	1.086	0.945	13.0	67	0.00
13	T	2,2-Dichloropropane	1.622	1.370	15.5	66	0.00
14	T	1,1-Dichloropropene	1.592	1.369	14.0	67	0.00
15	T	Thiophene	2.584	2.293	11.3	68	0.00
16	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	74	0.00
17	T	2,3-Dimethylpentane	0.365	0.327	10.4	68	0.00
18	T	Dibromomethane	0.195	0.172	11.8	66	0.00
19	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	73	0.00
20	T	Methyl Cyclohexane	0.774	0.668	13.7	66	0.00
21	T	1,3-Dichloropropane	0.891	0.803	9.9	68	0.00
22	T	1,1,1,2-Tetrachloroethane	0.621	0.520	16.3	63	0.00
23	T	1-Chlorohexane	0.918	0.837	8.8	68	0.00
24	T	1,2,3-Trichloropropane	0.845	0.771	8.8	72	0.00
25	T	Bromobenzene	1.031	0.925	10.3	72	0.00
26	T	2-Chlorotoluene	1.927	1.754	9.0	73	0.00
27	T	4-Chlorotoluene	2.009	1.824	9.2	72	0.00
28	T	Indan	2.588	2.363	8.7	72	0.00
29	T	Indene	2.266	2.122	6.4	72	0.00
30	T	1,2,4,5-Tetramethylbenzene	2.719	2.548	6.3	68	0.00
31	T	1,2,3,4-Tetramethylbenzene	2.811	2.647	5.8	69	0.00
32	T	1,2,3,5-Tetramethylbenzene	2.670	2.538	4.9	68	0.00
33	T	1,2,3-Trichlorobenzene	1.112	1.164	-4.7	71	0.00

(#) = Out of Range SPCC s out = 0 CCC s out = 0

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131502.D
Acq On : 13 Feb 2015 6:14 Operator: SC
Sample : CCV C9021315_25ng
Misc : S29-01081512/S29-01291503 (2/27)
ALS Vial : 2 Sample Multiplier: 1

2/13/15

Quant Time: Feb 13 15:01:23 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

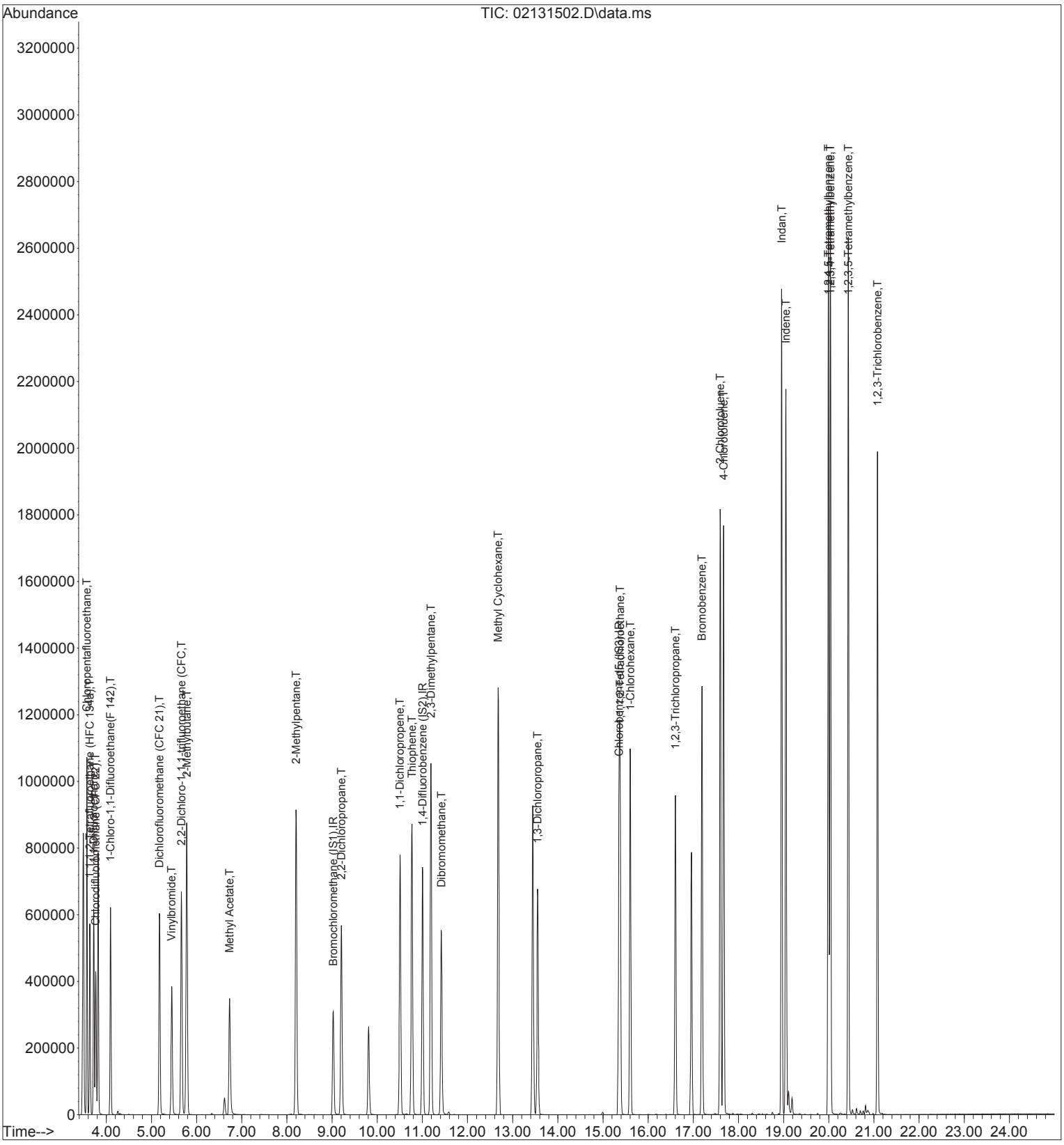
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	9.03	130	159672	12.500	ng	0.00
16) 1,4-Difluorobenzene (IS2)	11.01	114	795299	12.500	ng	0.00
19) Chlorobenzene-d5 (IS3)	15.35	82	308859	12.500	ng	0.00
Target Compounds						Qvalue
2) Chloropentafluoroethane	3.57	85	398309	23.858	ng	99
3) 1,1,1,2-Tetrafluoroeth...	3.63	83	265686	22.398	ng	98
4) 1,1-Difluoroethane	3.72	65	264050	23.921	ng	98
5) Chlorodifluoromethane ...	3.76	67	78638	22.565	ng	95
6) 1-Chloro-1,1-Difluoroe...	4.09	65	506576	21.734	ng	99
7) Dichlorofluoromethane ...	5.18	67	626021	22.413	ng	100
8) Vinylbromide	5.45	108	302423	22.806	ng	100
9) 2,2-Dichloro-1,1,1-tri...	5.66	83	459092	23.007	ng	100
10) 2-Methylbutane	5.78	57	297650	23.204	ng	99
11) Methyl Acetate	6.73	43	537269	20.533	ng	99
12) 2-Methylpentane	8.20	71	298777	21.545	ng	99
13) 2,2-Dichloropropane	9.21	77	446217	21.535	ng	100
14) 1,1-Dichloropropene	10.50	75	450188	22.139	ng	98
15) Thiophene	10.77	84	739587	22.408	ng	99
17) 2,3-Dimethylpentane	11.19	56	534987	23.033	ng	99
18) Dibromomethane	11.42	174	296126	23.891	ng	99
20) Methyl Cyclohexane	12.68	55	441205	23.080	ng	98
21) 1,3-Dichloropropane	13.55	76	520831	23.649	ng	98
22) 1,1,1,2-Tetrachloroethane	15.38	131	340571	22.201	ng	100
23) 1-Chlorohexane	15.61	91	527247	23.246	ng	98
24) 1,2,3-Trichloropropane	16.60	75	505054	24.178	ng	100
25) Bromobenzene	17.19	77	611194	24.004	ng	98
26) 2-Chlorotoluene	17.60	91	1181132	24.812	ng	99
27) 4-Chlorotoluene	17.67	91	1183248	23.841	ng	99
28) Indan	18.95	117	1489010	23.283	ng	100
29) Indene	19.05	115	1297834	23.181	ng	100
30) 1,2,4,5-Tetramethylben...	19.99	119	1574028	23.433	ng	99
31) 1,2,3,4-Tetramethylben...	20.04	119	1618474	23.302	ng	99
32) 1,2,3,5-Tetramethylben...	20.43	119	1536688	23.292	ng	99
33) 1,2,3-Trichlorobenzene	21.08	180	704791	25.658	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS09\Data\2015_02\13\02131502.D
Acq On : 13 Feb 2015 6:14 Operator: SC
Sample : CCV C9021315_25ng
Misc : S29-01081512/S29-01291503 (2/27)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Feb 13 15:01:23 2015
Quant Method : I:\MS09\Methods\ACF9010915.M
Quant Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
QLast Update : Mon an 12 09:53:23 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

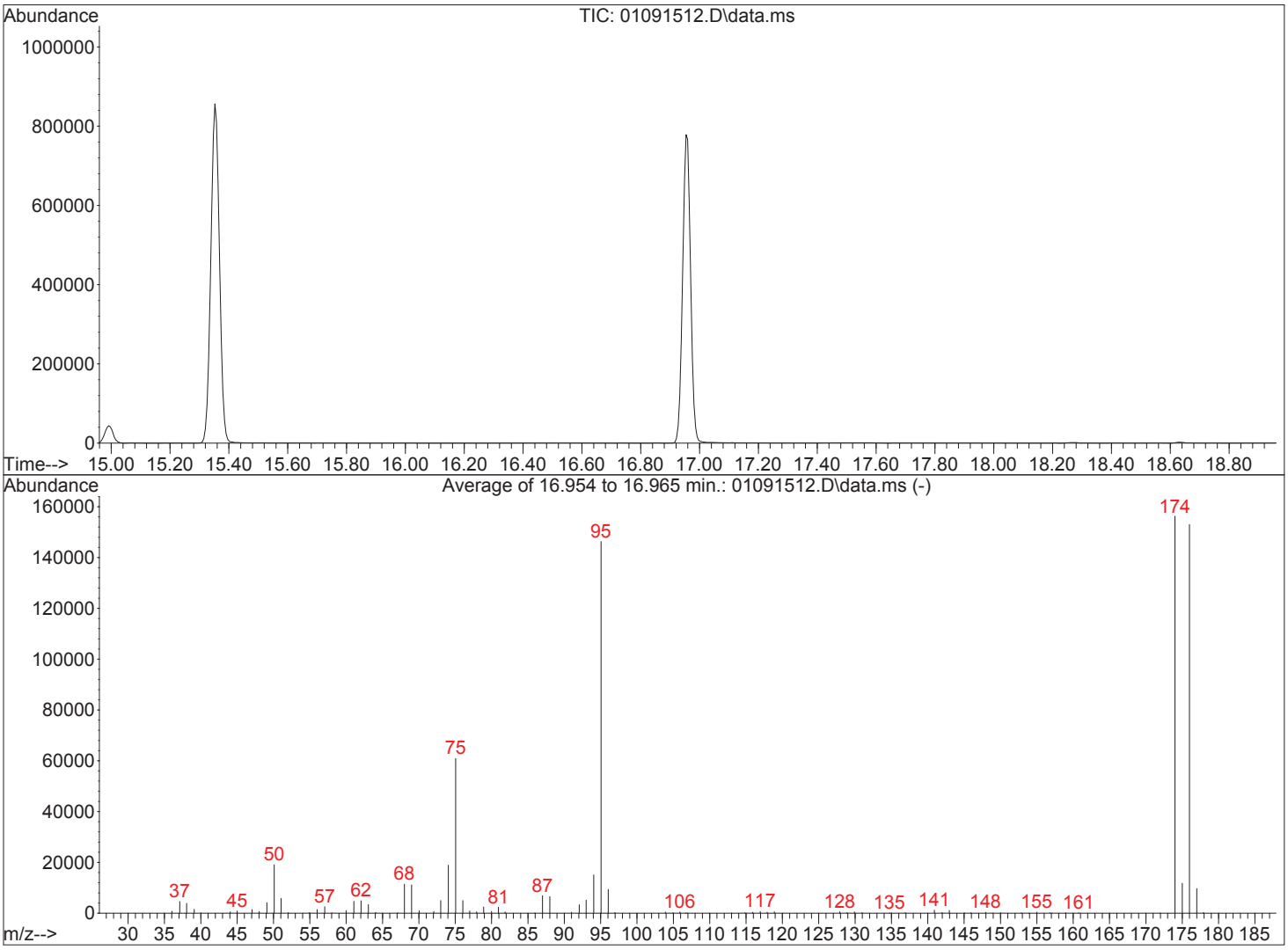


Data Path : I:\MS09\Data\2015_01\09\
Data File : 01091512.D
Acq On : 9 an 2015 17:14
Operator : SC
Sample : 12.5ng TO-15 BFB STD
Misc : S29-01081412
ALS Vial : 2 Sample Multiplier: 1

1/12/15

Integration File: RTEINT.P

Method : I:\MS09\Methods\R9010915.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Mon an 12 09:00:03 2015



AutoFind: Scans 2517, 2518, 2519 Background Corrected with Scan 2506

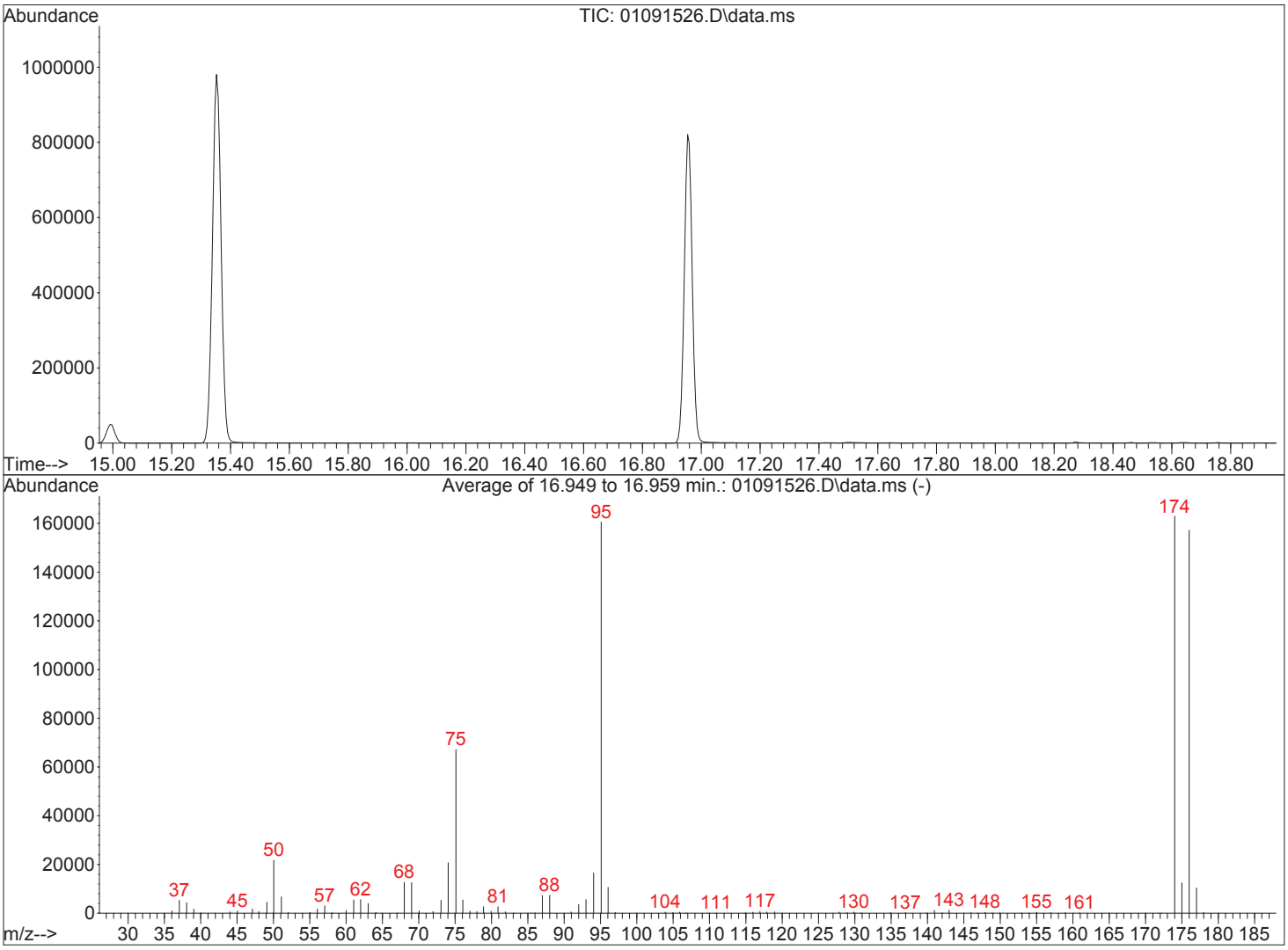
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	13.0	19087	PASS
75	95	30	66	41.6	60912	PASS
95	95	100	100	100.0	146339	PASS
96	95	5	9	6.4	9348	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	106.8	156288	PASS
175	174	4	9	7.5	11781	PASS
176	174	93	101	97.9	153024	PASS
177	176	5	9	6.3	9677	PASS

Data Path : I:\MS09\Data\2015_01\09\
Data File : 01091526.D
Acq On : 10 an 2015 1:04
Operator : SC
Sample : 12.5ng TO-15 AC F BFB STD
Misc : S29-01081412
ALS Vial : 2 Sample Multiplier: 1

1/12/15

Integration File: RTEINTVB.P

Method : I:\MS09\Methods\ACF9010915.M
Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
Last Update : Mon an 12 09:44:35 2015



AutoFind: Scans 2516, 2517, 2518 Background Corrected with Scan 2506

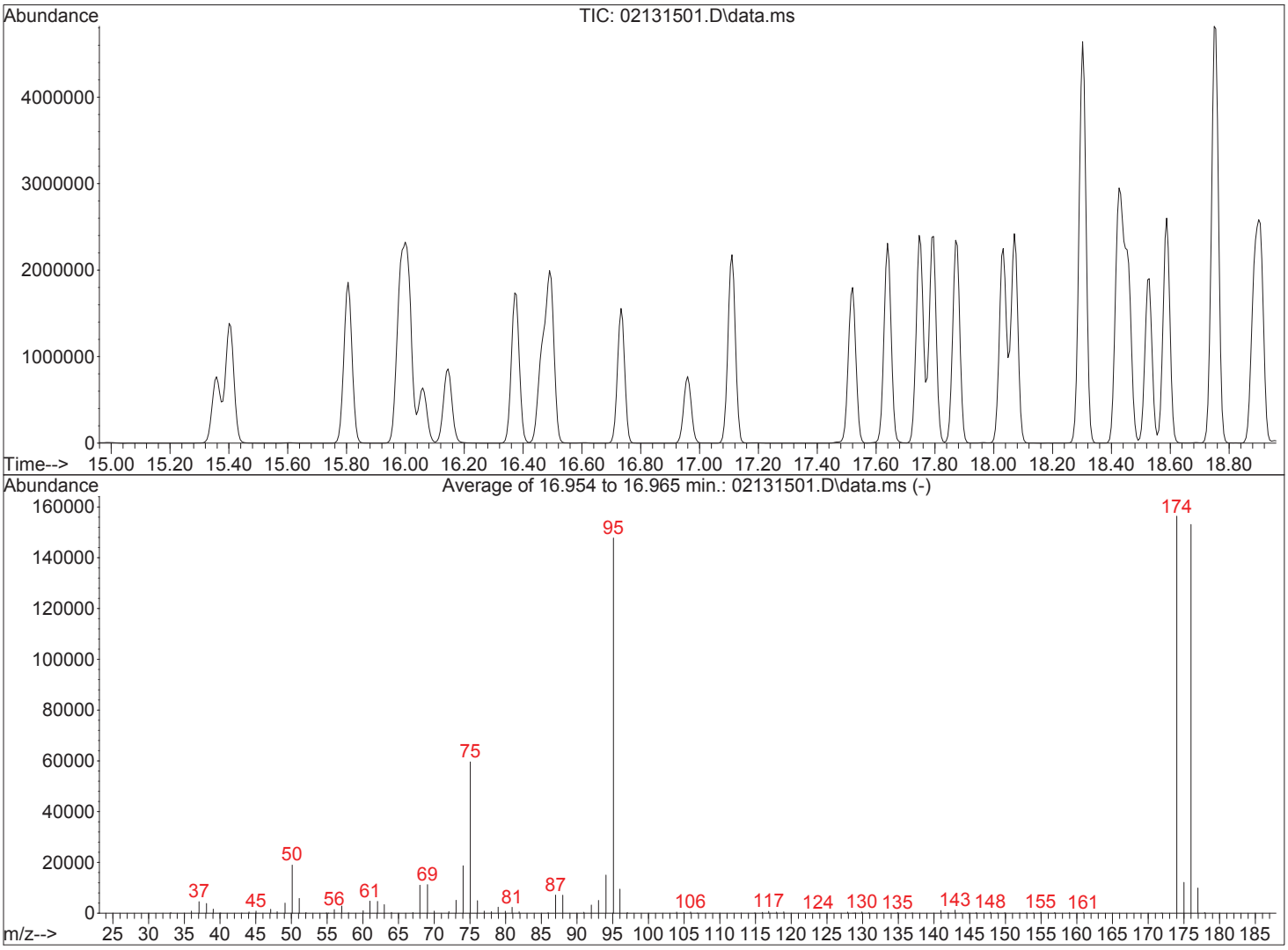
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	13.5	21707	PASS
75	95	30	66	41.9	67208	PASS
95	95	100	100	100.0	160555	PASS
96	95	5	9	6.6	10610	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	101.5	162965	PASS
175	174	4	9	7.7	12481	PASS
176	174	93	101	96.4	157141	PASS
177	176	5	9	6.6	10387	PASS

Data Path : I:\MS09\Data\2015_02\13\
Data File : 02131501.D
Acq On : 13 Feb 2015 5:40
Operator : SC
Sample : CCV R9021315_25ng
Misc : S29-01081512/S29-02031502 (3/4)
ALS Vial : 2 Sample Multiplier: 1

2/13/15

Integration File: RTEINT.P

Method : I:\MS09\Methods\R9010915.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Mon an 12 09:19:02 2015



AutoFind: Scans 2517, 2518, 2519 Background Corrected with Scan 2507

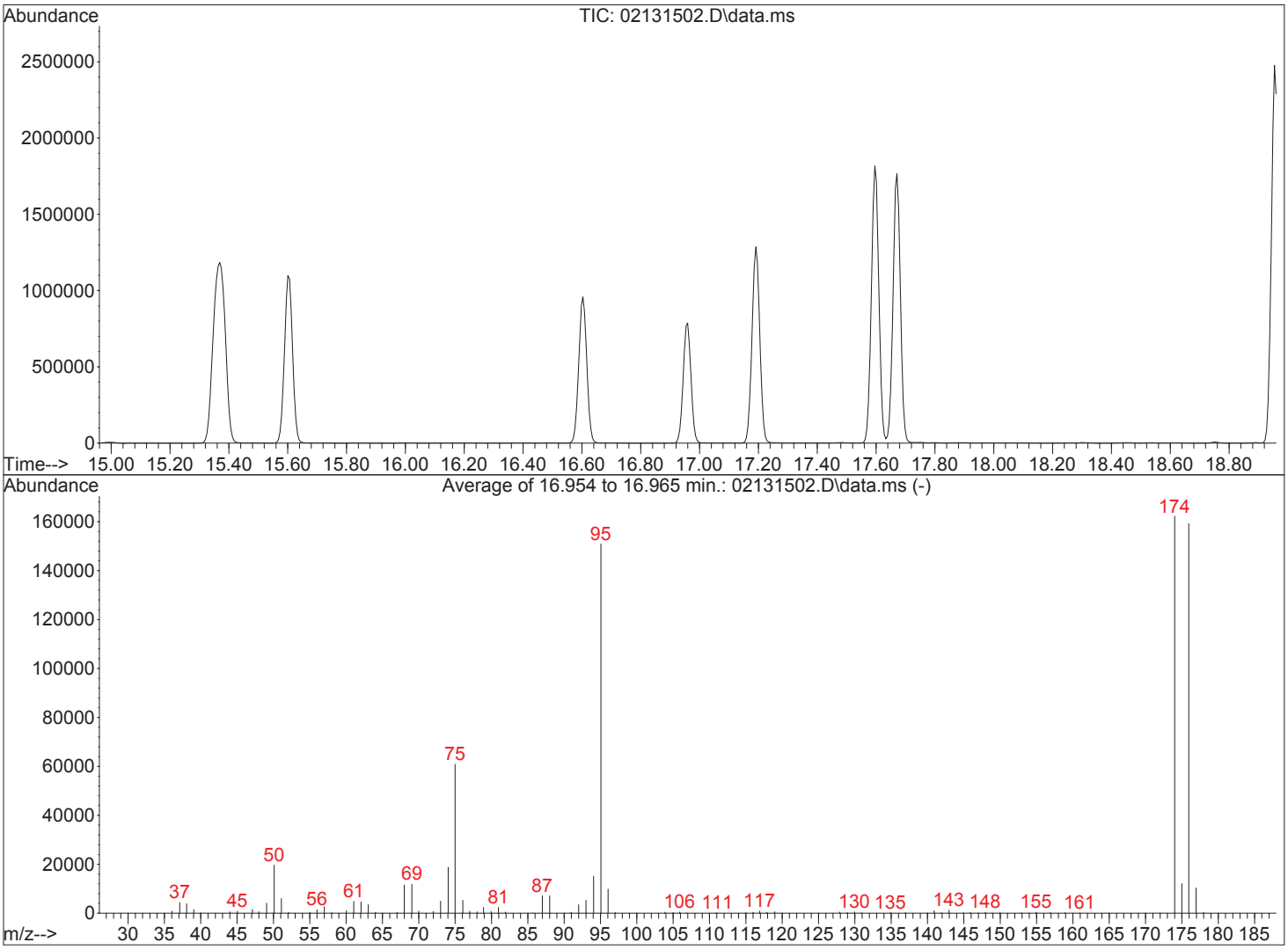
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	12.8	18973	PASS
75	95	30	66	40.3	59581	PASS
95	95	100	100	100.0	147776	PASS
96	95	5	9	6.4	9487	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	105.8	156373	PASS
175	174	4	9	7.8	12172	PASS
176	174	93	101	97.9	153109	PASS
177	176	5	9	6.5	9943	PASS

Data Path : I:\MS09\Data\2015_02\13\
Data File : 02131502.D
Acq On : 13 Feb 2015 6:14
Operator : SC
Sample : CCV C9021315_25ng
Misc : S29-01081512/S29-01291503 (2/27)
ALS Vial : 2 Sample Multiplier: 1

2/13/15

Integration File: RTEINTVB.P

Method : I:\MS09\Methods\ACF9010915.M
Title : TO-15 Tekmar AutoCan/HP 6890/HP 5975 MSD
Last Update : Mon an 12 09:53:23 2015



AutoFind: Scans 2517, 2518, 2519 Background Corrected with Scan 2507

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	13.0	19614	PASS
75	95	30	66	40.3	60843	PASS
95	95	100	100	100.0	150891	PASS
96	95	5	9	6.5	9835	PASS
173	174	0.00	2	0.0	0	PASS
174	95	50	120	107.5	162240	PASS
175	174	4	9	7.4	12071	PASS
176	174	93	101	98.1	159168	PASS
177	176	5	9	6.5	10274	PASS

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	1/9/15 9:09	01091501.D	CCV AC&F R9010915_25ng	S29-12081401/S29-12301401 (1/28)	SC	2	
2	1/9/15 9:43	01091502.D	CCV R9010915_25ng	S29-12081401/S29-01081504 (2/6)	SC	3	
3	1/9/15 10:45	01091503.D	MB R010815_1000ml	S29-12081401	SC	2	
4	1/9/15 11:19	01091504.D	LCS R9010815_25ng	S29-12081401/S29-01051502 (2/3)	SC	4	
5	1/9/15 11:53	01091505.D	RL R9010815_0.5ng	S29-12081401/S29-12291405 (1/27)	SC	5	
6	1/9/15 12:37	01091506.D	Lab Air (100ml)	S29-12081401	SC	16	
7	1/9/15 13:26	01091507.D	Blank (100ml)	S29-12081401	SC	2	
8	1/9/15 14:57	01091509.D	Blank (100ml)	S29-01081412	SC	2	
9	1/9/15 15:36	01091510.D	Blank (100ml)	S29-01081412	SC	2	
10	1/9/15 16:41	01091511.D	Blank (100ml)	S29-01081412	SC	2	
11	1/9/15 17:14	01091512.D	12.5ng TO-15 BFB STD	S29-01081412	SC	2	
12	1/9/15 17:48	01091513.D	0.08ng TO-15 ICAL STD	S29-01081412/S29-01081511 (2/6)	SC	13	
13	1/9/15 18:21	01091514.D	0.10ng TO-15 ICAL STD	S29-01081412/S29-01081511 (2/6)	SC	13	
14	1/9/15 18:55	01091515.D	0.20ng TO-15 ICAL STD	S29-01081412/S29-01081511 (2/6)	SC	13	
15	1/9/15 19:29	01091516.D	0.40ng TO-15 ICAL STD	S29-01081412/S29-01081511 (2/6)	SC	13	
16	1/9/15 20:02	01091517.D	1.0ng TO-15 ICAL STD	S29-01081412/S29-01081505 (2/6)	SC	14	
17	1/9/15 20:36	01091518.D	5.0ng TO-15 ICAL STD	S29-01081412/S29-01081505 (2/6)	SC	14	
18	1/9/15 21:10	01091519.D	25ng TO-15 ICAL STD	S29-01081412/S29-01081504 (2/6)	SC	3	
19	1/9/15 21:43	01091520.D	50ng TO-15 ICAL STD	S29-01081412/S29-01081504 (2/6)	SC	3	
20	1/9/15 22:17	01091521.D	100ng TO-15 ICAL STD	S29-01081412/S29-01081504 (2/6)	SC	3	
21	1/9/15 22:50	01091522.D	Blank (100ml)	S29-01081412	SC	2	
22	1/9/15 23:24	01091523.D	25ng TO-15 ICV STD	S29-12081401/S29-01051502 (2/3)	SC	15	*Pass*
23	1/9/15 23:57	01091524.D	25ng TO-15 ICV STD	S29-12081401/S29-01051502 (2/3)	SC	16	*cf*
24	1/10/15 0:31	01091525.D	Blank (100ml)	S29-01081412	SC	2	
25	1/10/15 1:04	01091526.D	12.5ng TO-15 AC&F BFB STD	S29-01081412	SC	2	
26	1/10/15 1:38	01091527.D	0.4ng TO-15 AC&F ICAL STD	S29-01081412/S29-01091501 (2/7)	SC	15	
27	1/10/15 2:12	01091528.D	1.0ng TO-15 AC&F ICAL STD	S29-01081412/S29-01091501 (2/7)	SC	15	
28	1/10/15 2:45	01091529.D	2.5ng TO-15 AC&F ICAL STD	S29-01081412/S29-01091501 (2/7)	SC	15	
29	1/10/15 3:19	01091530.D	5.0ng TO-15 AC&F ICAL STD	S29-01081412/S29-01091501 (2/7)	SC	15	
30	1/10/15 3:52	01091531.D	25ng TO-15 AC&F ICAL STD	S29-01081412/S29-12301401 (1/28)	SC	2	
31	1/10/15 4:26	01091532.D	50ng TO-15 AC&F ICAL STD	S29-01081412/S29-12301401 (1/28)	SC	2	
32	1/10/15 4:59	01091533.D	100ng TO-15 AC&F ICAL STD	S29-01081412/S29-12301401 (1/28)	SC	2	
33	1/10/15 5:33	01091534.D	Blank (100ml)	S29-01081412	SC	2	
34	1/10/15 6:06	01091535.D	25ng TO-15 AC&F ICV STD	S29-01081412/S29-01091505 (2/7)	SC	16	*Pass*
35	1/10/15 6:40	01091536.D	25ng TO-15 AC&F ICV STD	S29-01081412/S29-01091505 (2/7)	SC	16	*cf*
	R9010915.M Ical passed 0.08ng/L---100ng/L for all compound.						
	AC&F9010915.M Ical passed 0.4ng/L---100ng/L for all compoung.						

1/12/15

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	2/13/15 5:40	02131501.D	CCV R9021315_25ng	S29-01081512/S29-02031502 (3/4)	SC	2	*Pass*
2	2/13/15 6:14	02131502.D	CCV C9021315_25ng	S29-01081512/S29-01291503 (2/27)	SC	2	*Pass*
3	2/13/15 6:48	02131503.D	Blank (100ml)	S29-01081512	SC	2	*Pass*
4	2/13/15 7:22	02131504.D	MB R9021315_1000ml	S29-01081512	SC	2	*Pass*
5	2/13/15 7:55	02131505.D	LCS R9021315_25ng	S29-01081512/S29-01221502 (2/20)	SC	4	*Pass*
6	2/13/15 8:29	02131506.D	LCSD R9021315_25ng	S29-01081512/S29-01221502 (2/20)	SC	4	*Pass*
7	2/13/15 9:20	02131507.D	P1500494-003 (10ml)	S29-01081512	SC	1	
8	2/13/15 9:54	02131508.D	P1500494-001 (400ml)	S29-01081512	SC	5	
9	2/13/15 10:27	02131509.D	P1500494-002 (400ml)	S29-01081512	SC	12	
10	2/13/15 11:06	02131510.D	P1500580-001 (25ml)	S29-01081512	SC	6	
11	2/13/15 11:40	02131511.D	P1500580-002 (25ml)	S29-01081512	SC	7	
12	2/13/15 12:14	02131512.D	P1500493-001 (400ml)	S29-01081512	SC	13	
13	2/13/15 12:48	02131513.D	P1500493-002 (25ml)	S29-01081512	SC	14	
14	2/13/15 13:21	02131514.D	P1500493-003 (100ml)	S29-01081512	SC	15	
15	2/13/15 13:55	02131515.D	P1500493-004 (400ml)	S29-01081512	SC	16	
16	2/13/15 14:29	02131516.D	P1500580-001Dil (5ml)	S29-01081512	SC	1	
17	2/13/15 15:02	02131517.D	P1500493-003 (400ml)	S29-01081512	SC	15	
18	2/13/15 15:36	02131518.D	P1500580-002Dil (5ml)	S29-01081512	SC	1	
19	2/13/15 16:10	02131519.D	Blank (25ml)	S29-01081512	SC	14	
20	2/13/15 16:53	02131520.D	J1501254-001 (5ml)	S29-01081512	SC	1	*cf*
21	2/13/15 17:44	02131521.D	Blank (100ml)	S29-01081512	SC	2	
22	2/13/15 18:18	02131522.D	J1501254-001 (20ml)	S29-01081512	SC	15	
23	2/13/15 18:51	02131523.D	J1501254-001DUP (20ml)	S29-01081512	SC	16	*Pass*
24	2/13/15 19:25	02131524.D	Blank (100ml)	S29-01081512	SC	2	
25	2/13/15 19:59	02131525.D	P1500369-001 (1000ml)	S29-01081512	SC	5	
26	2/13/15 20:33	02131526.D	P1500369-002 (1000ml)	S29-01081512	SC	6	
27	2/13/15 21:07	02131527.D	P1500369-003 (1000ml)	S29-01081512	SC	7	
28	2/13/15 21:41	02131528.D	P1500369-004 (1000ml)	S29-01081512	SC	8	
29	2/13/15 22:15	02131529.D	CCV2 R9021315_25ng	S29-01081512/S29-02031502 (3/4)	SC	2	

2/16/15

APPENDIX F

O&M MANUAL

PROVIDED IN ELECTRONIC VERSION ONLY

MAE² MID-ATLANTIC ENVIRONMENTAL EQUIPMENT

MID ATLANTIC ENVIRONMENTAL EQUIPMENT

15 CARROLL DRIVE

BLUFFTON, SC 29910

OPERATION & MAINTENANCE MANUAL

Project:

Kennedy Space Center

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Section 1: Major System Components

- Air Compressor
- Air Receiver
- Solenoid Valves
- Pressure Regulators
- Compressor Oil Filter
- Compressor Particulate Filter
- Compressor Oil Separator
- Cargo Trailer Air Conditioner

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- Piping & Instrumentation Diagram
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- HMI
- Ethernet Switch
- Cellular modem

MAE² MID-ATLANTIC ENVIRONMENTAL EQUIPMENT

SECTION 1:

MAJOR SYSTEM COMPONENTS

Atlas Copco

Oil-injected Rotary Screw Compressors
GA 30+-90/GA 37-90 VSD (30-90 kW/40-125 hp)





Sustainable Productivity

Atlas Copco



The ultimate smart solution, driven by efficiency

Atlas Copco's GA 30+-90 compressors bring you outstanding sustainability, reliability and performance, while minimizing the total cost of ownership. A choice of three premium compressor types (GA VSD, GA+ and GA) provides you with the compressed air solution that perfectly matches your requirements with clear value propositions. Built to perform even in the harshest environments, these compressors keep your production running efficiently.



NEW HEIGHTS IN SUSTAINABILITY

The GA 30+-90 family enables you to realize sustainable productivity through lower lifecycle costs and maximum uptime. IE3 or NEMA Premium Efficiency motors in combination with the highly efficient element minimize operating cost. The integrated dryer R410A reduces ozone depletion and protects the environment. Maximum uptime is achieved by maintenance from one side and complete drive train accessibility.





BENCHMARKING PERFORMANCE

Outstanding performance is ensured by design, with IE3 or NEMA Premium Efficiency motors in combination with Atlas Copco's highly efficient element and an oversized cooling arrangement resulting in significant energy savings. Internal pressure drops from inlet to discharge are optimized. Efficient smart compressor controls and Atlas Copco algorithms minimize the working pressure band, saving energy.

NEW MILESTONES IN RELIABILITY

The reliability of the GA 30+-90 range starts with the cool canopy and low element outlet temperatures, an oversized separate oil cooler and an aftercooler with patented integrated mechanical separator. The three-stage air/oil separation ensures low oil consumption. All electrical cubicles are in overpressure, preventing electrically conductive dust, thus increasing the lifetime of electrical components.



GA VSD: ULTIMATE ENERGY SAVER

- Unique integrated Variable Speed Drive (VSD) technology for on average 35% energy savings.
- Industry-leading operating turndown range and flexible pressure selection: 4-13 bar.
- Start under system pressure due to special VSD motor, no idling time.
- Integrated Dryer Saver Cycle saves up to 60% of the dryer's electrical consumption.
- Smart Elektronikon® graphic compressor controller with high-definition color display working to a set point minimizes pressure drops.

IE3/NEMA PREMIUM

GA+: INDUSTRY-LEADING PERFORMANCE

- Industry-leading Free Air Delivery and low energy consumption.
- IE3 / NEMA Premium Efficiency motor combined with highly efficient element.
- Low noise emission suitable for workplace installation.
- Environmentally-friendly R410A integrated dryer reduces footprint and pressure drops.
- Smart Elektronikon® graphic compressor controller with high-definition color display.

GA: PREMIUM COMPRESSOR

- High performance Free Air Delivery.
- IE2 / NEMA Premium Efficiency motor in combination with highly efficient element.
- Premium quality at the lowest initial investment.
- Efficient environmentally-friendly R410A integrated dryer reduces footprint and pressure drops.
- Ensured efficiency of Elektronikon® controller with connectivity.

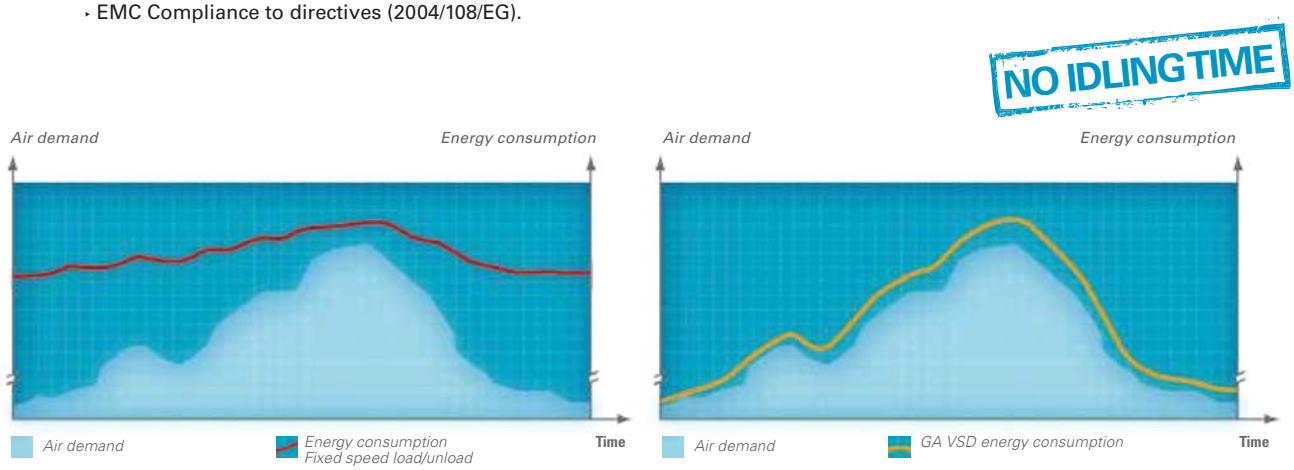


VSD: Driving down your energy costs

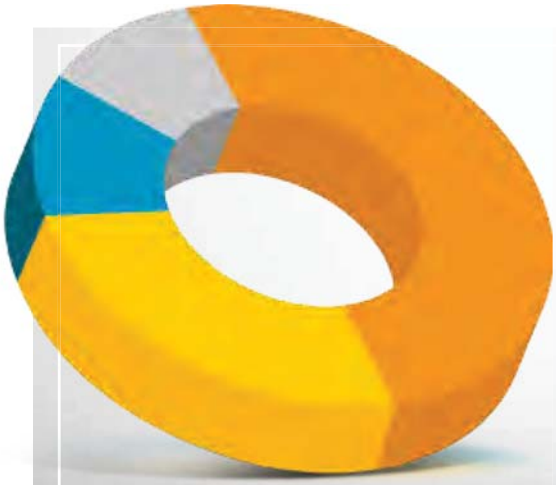
Over 80% of a compressor's lifecycle cost is taken up by the energy it consumes. Moreover, the generation of compressed air can account for more than 40% of a plant's total electricity bill. To cut your energy costs, Atlas Copco pioneered Variable Speed Drive (VSD) technology in the compressed air industry. VSD leads to major energy savings, while protecting the environment for future generations. Thanks to continual investments in this technology, Atlas Copco offers the widest range of integrated VSD compressors on the market.

WHY ATLAS COPCO VARIABLE SPEED DRIVE TECHNOLOGY?

- On average 35% energy savings during fluctuations in production demand with an extensive turndown range.
- Integrated Elektronikon® Graphic controller controls the motor speed and high efficiency frequency inverter.
- No wasted idling times or blow-off losses in normal operation.
- Compressor can start/stop under full system pressure without the need to unload with special VSD motor.
- Eliminates peak current penalty during start-up.
- Minimizes system leakage due to a lower system pressure.
- EMC Compliance to directives (2004/108/EG).



In almost every production environment, air demand fluctuates depending on different factors such as the time of the day, week or even month. Extensive measurements and studies of compressed air demand profiles show that many compressors have substantial variations in air demand.



ON AVERAGE 35% ENERGY SAVINGS

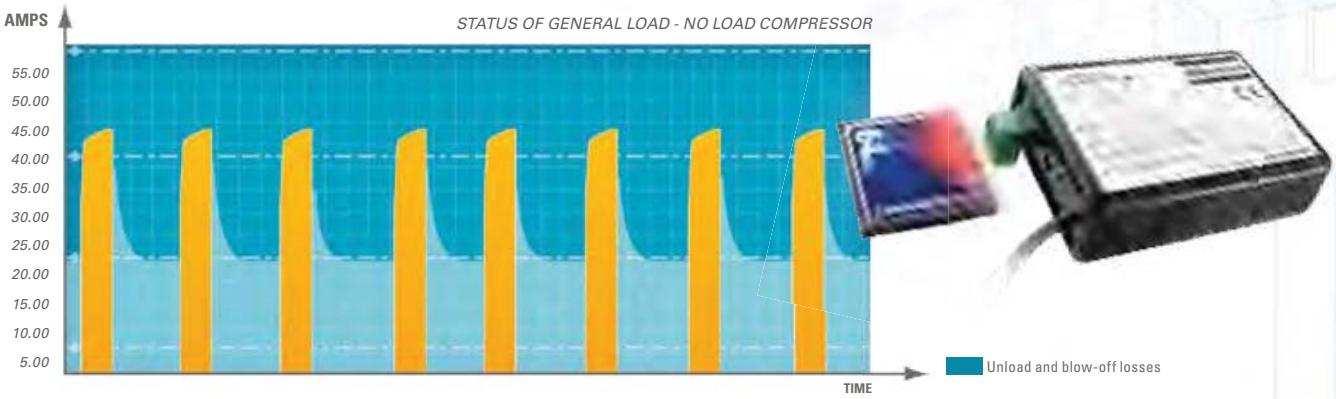
Atlas Copco's GA VSD technology closely follows the air demand by automatically adjusting the motor speed. This results in on average 35% energy savings. The lifecycle cost of a compressor can be cut by an average of 22%. In addition, lowered system pressure with GA VSD dramatically minimizes energy use across your production.

TOTAL COMPRESSOR LIFECYCLE COST

- *Energy*
- *Investment*
- ***Energy savings with VSD***
- *Maintenance*

HOW GA VSD TECHNOLOGY SAVES ENERGY

Contact your local Atlas Copco representative for an audit of your compressed air system. A real-time measurement simulation and audit report can be provided with recommendations for additional savings and sizing to meet your compressed air needs.



WHAT IS UNIQUE ABOUT THE INTEGRATED ATLAS COPCO GA VSD?

1 The Elektronikon® controls both the compressor and the integrated converter, ensuring maximum machine safety within parameters.

2 Flexible pressure selection from 4 to 13 bar with electronic gearing reduces electricity costs.

3 Special electric motor specifically designed for VSD operation (inverter duty motor). Bearings are protected against induced bearing currents. Both motor and converter are perfectly tuned for highest efficiency across the entire speed range.

4 Electric motor specifically designed for low operating speeds with clear attention to motor cooling and compressor cooling requirements.

5 All Atlas Copco GA VSD compressors are EMC tested and certified. External sources do not influence compressor operation, nor does the compressor affect the operation of other instruments via emissions or via the power supply line.

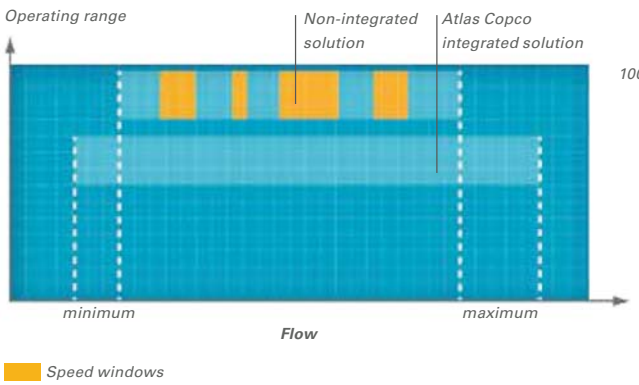
6 Mechanical enhancements ensure that all components operate below critical vibration levels throughout the entire compressor speed range.

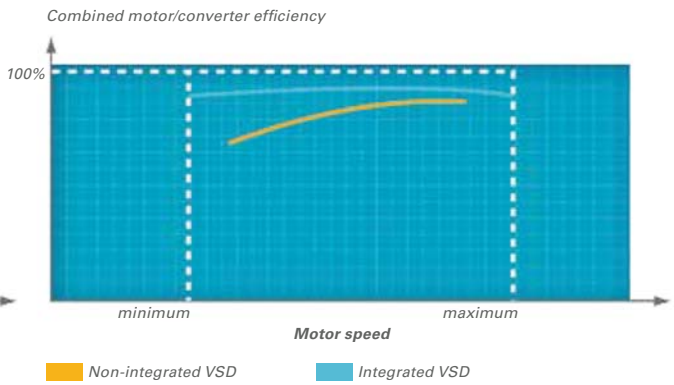
7 A highly efficient frequency converter in a cool overpressure cubicle ensures stable operation in high ambient temperatures up to 50°C/122°F*.
* Standard up to 46°C/114.8°F.

8 No 'speed windows' that can jeopardize the energy savings and the stable net pressure. Turndown capability of the compressor is maximized to 80-85%.

9 The cubicle cooling booster increases the lifetime of electrical components due to a cool cubicle in overpressure and reduced dust ingress.

10 Net pressure band is maintained within 0.10 bar, 1.5 psi.





High reliability and smart energy

1

Maintenance-free drive system

- 100% maintenance-free; totally enclosed and protected against dirt and dust.
- Suitable for harsh environments.
- High-efficiency drive arrangement; no coupling or slippage losses.
- Standard up to 46˚C/115˚F and for high ambient version 55˚C/131˚F.



2

IE3 / NEMA Premium Efficiency electrical motors

- IP55, insulation Class F, B rise.
- Non-drive side bearing greased for life.
- Designed for continuous operation in harsh environments.



3

Robust spin-on oil filter

- High-efficiency, removing 300% smaller particles than a conventional filter.
- Integrated bypass valve with the oil filter.

4

SIL Smart inlet lock system for GA VSD compressors

- Superior designed vacuum and air pressure controlled valve with minimal pressure drop and no springs.
- Smart stop/start which eliminates back-pressure oil vapor.



5

Separate oversized oil cooler and aftercooler

- Low element outlet temperatures, ensuring long oil lifetime.
- Removal of nearly 100% condensate by mechanical separator.
- No consumables.
- Eliminates possibility of thermal shocks in coolers.



10

Integrated highly efficient R410A dryer

- Excellence in air quality.
- 50% reduction in energy consumption compared to traditional dryers.
- Zero ozone depletion.
- Incorporates optional DD and PD filters according to Class 1.4.1.

9

Cubicle cooling booster

- Cubicle in overpressure minimizes ingress of conductive dust.
- Electrical components remain cool, enhancing lifetime of components.



8

Elektronikon® for remote monitoring

- Integrated smart algorithms reduce system pressure and energy consumption.
- Monitoring features include warning indications, maintenance scheduling and online visualization of machine's condition.

7

Heavy-duty air intake filter

- Protects the compressor components by removing 99.9% of dirt particles down to 3 microns.
- Differential inlet pressure for proactive maintenance while minimizing pressure drop.



6

Electronic no-loss water drain

- Ensures constant removal of condensate.
- Manual integrated bypass for effective condensate removal in case of power failure.
- Integrated with compressor's Elektronikon® with warning/alarm features.

A step ahead in monitoring and controls

The next-generation Elektronikon® operating system offers a wide variety of control and monitoring features that allow you to increase your compressor's efficiency and reliability. To maximize energy efficiency, the Elektronikon® controls the main drive motor and regulates system pressure within a predefined and narrow pressure band.



IMPROVED USER-FRIENDLINESS

- 3.5-inch high-definition color display with clear pictograms and extra 4th LED indicator for service.
- Graphical display of key parameters (day, week, month) and 32 language settings.
- Internet-based compressor visualization using a simple Ethernet connection.
- On-screen Delayed Second Stop function and VSD savings indication.
- Graphical indication Serviceplan, remote control and connectivity functions.
- Software upgrade available to control up to 6 compressors by installing the optional integrated compressor controller.



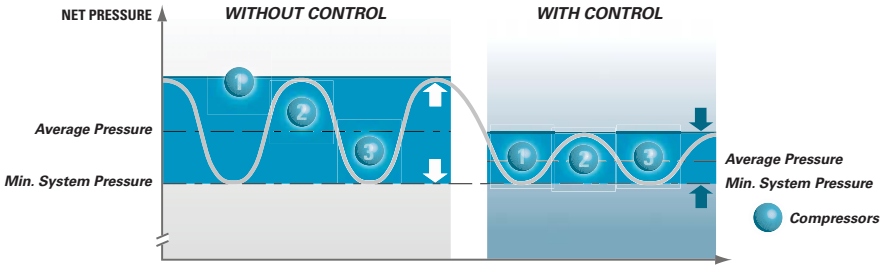
ONLINE & MOBILE MONITORING

Monitor your compressors over the Ethernet with the new Elektronikon® controller. Monitoring features include warning indications, compressor shut-down and maintenance scheduling. The Atlas Copco App is available for iPhone/Android phones as well as iPad and Android tablets. It allows fingertip monitoring of your compressed air system through your own secured network.

Optional integrated compressor controller

Install, with a simple license, the optional integrated compressor controller and get simple, central control to reduce system pressure and energy consumption in installations of up to 4 (ES4i) or 6 (ES6i) compressors.

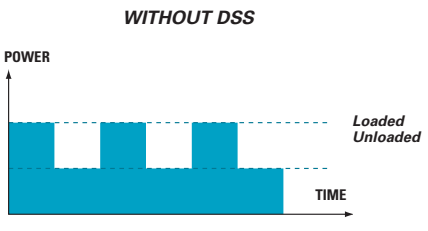


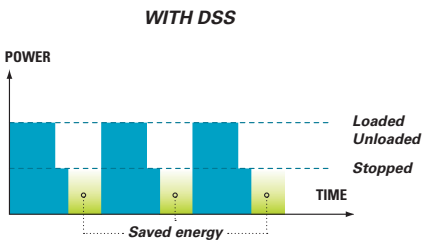


The Elektronikon® continuously monitors critical parameters. Monitoring features include service and warning indications, error detection, compressor shut-down and maintenance scheduling.

DUAL PRESSURE SET POINT & DELAYED SECOND STOP

Most production processes create fluctuating levels of demand which, in turn, can create energy waste in low use periods. Using either the standard or graphic Elektronikon® controller, you can manually or automatically create two different system pressure bands to optimize energy use and reduce costs at low use times. In addition, the sophisticated Delayed Second Stop (DSS) runs the drive motor only when needed. As the desired system pressure is maintained while the drive motor's run time is minimized, energy consumption is kept at a minimum.





INTEGRATED DRYER SAVER CYCLE

Saver Cycle technology reduces the energy consumption of the integrated refrigerant dryers with the fan in light load applications. Using an ambient sensor to monitor the required dew point suppression, the Elektronikon® starts and stops the dryer and the fan, minimizing energy use and protecting the air system from corrosion.

Excellence in integrated air quality

Untreated compressed air contains moisture, aerosols and dirt particles that can damage your air system and contaminate your end product, resulting in risk of corrosion and compressed air system leaks. Maintenance costs can far exceed air treatment costs. Our compressors provide the clean, dry air that improves your system's reliability, avoids costly downtime and production delays, and safeguards the quality of your products.

SAVE MONEY AND THE ENVIRONMENT

Avoid risk of corrosion and system leaks, and ensure the effective safe disposal of untreated condensate – all within ISO 14001 standards.

ZERO OZONE DEPLETION



ON AVERAGE 50% ENERGY SAVINGS WITH R410A INTEGRATED DRYERS

- Use of energy-efficient refrigerant R410A reduces operating costs.
- R410A refrigerant reduces global warming potential by an average of 50%.
- Environmentally-friendly characteristics; zero ozone depletion.
- Unique Saver Cycle Control, with ambient temperature sensor and based on dryer load and relative humidity of compressed air, saves energy at partial load.
- Heat exchanger cross-flow technology with low pressure drop.
- Zero waste of compressed air thanks to no-loss condensate drain.
- Pressure dew point of 3°C (100% relative humidity at 20°C).

INTEGRATED PURITY

The optional DD/PD filters and integrated refrigerant air dryer (IFD) efficiently remove moisture, aerosols and dirt particles to protect your investment. This air quality prolongs the life of downstream equipment, increasing efficiency and ensuring quality of your final product.

ISO quality class*	Dirt particle size	Water pressure dew point**	Oil concentration
3.-.4	3 microns	-	3 ppm
3.4.4	3 microns	+3°C, 37°F	3 ppm
2.4.2	1 micron	+3°C, 37°F	0.1 ppm
1.4.1	0.01 microns	+3°C, 37°F	0.01 ppm

**The table values reflect the maximum limits according to the temperature ISO gravity class.*
*** Water pressure dew point based on 100% RH at 20°C/68°F.*

WorkPlace: Compressed air at the point of use

With the industry-leading low noise operation and integration of air and condensate treatment equipment, the GA+ offers complete versatility for your production. The compressor's integrated design allows it to be placed on the production floor, creating substantial energy savings for your business.

LOW INSTALLATION COSTS

- The GA+ can operate close to the point of use – eliminating the need for a dedicated compressor room.
- The GA+ is delivered ready for use – minimizing production downtime and reducing installation costs.
- Filtration equipment is integrated – reducing the need for costly external piping and minimizing pressure drops.
- Low noise enables the above to be a reality.



REDUCED ENERGY AND MAINTENANCE COSTS

- With less external piping, the GA+ minimizes pressure drop across the system which can reduce energy costs.
- The filtration system produces clean air to prevent network corrosion – minimizing energy, repair and maintenance costs.
- The GA+ operates at the lowest possible system pressure to reduce energy costs thanks to the Elektronikon® advanced monitoring system.

INTEGRATED CONDENSATE MANAGEMENT

- OSCi is an efficient integrated solution that removes oil from condensate.
- Oil carryover contained in condensate can harm the environment.
- Treated condensate protects water, wildlife and ecosystems.
- The delivered water is harmless and can be disposed in a sewage system, reducing disposal costs.



Optimize your system

Some applications may need or may benefit from additional options and more refined control/air treatment systems. To meet these needs, Atlas Copco has developed options and easily integrated compatible equipment.

		GA 30+-90	GA 37-90 VSD
Air treatment	Integrated filter kit class 1*	√	√
	Integrated filter kit class 2*	√	√
	Dryer bypass*	√	√
Condensate	OSCi	√	√
Protection	Oil retaining frame	√	√
	Motor space heater	-	√
	Motor space heater + thermistors	√	-
	Water shut-off valve**	√	√
	Phase sequence relay (GA 55-90)	√	-
	Tropical thermostat	√	-
	Freeze protection	√	√
	NEMA 4 cubicle	√	-
	NEMA 4X cubicle	√	-
	Pre-filter	√	√
	Advanced monitoring	√	√
	ANSI flange outlet	√	√
	DIN flange outlet	√	√
Public works	Rain protection	√	-
	Main power isolator switch	√	√
	Lifting device	√	√
	Oversized motor (except GA 45+ & GA 90)	√	-
Communication	ES 100 relays***	√	√
	AIRconnect	√	√
	Elektronikon® Graphic upgrade (only for GA 37 to GA 75)	√	-
	ES4i/ES6i (for Elektronikon® Graphic)	√	√
	Digital I/O expansion module	√	√
Oils	Food grade oil	√	√
	Roto – Xtend duty oil (8000 hours)	√	√
General options	Witness performance test	√	√
	Energy recovery	√	√
	Power duct fan	√	√
	Modulating control	√	-
	High-ambient temperature version (HAV 55°C, 131°F)****	√	√
	IT/TT ancillaries	-	√

FF units only. ** Water-cooled units. * Includes potential-free contacts: motor running, compressor load/unload. **** FF units max 50°C, 122°F.*

INTEGRATED ENERGY RECOVERY

As much as 90% of the electrical energy used by a compressed air solution is converted into heat. Using Atlas Copco's integrated energy recovery systems, it is feasible to recover up to 75% of that power input as hot air or hot water without any influence on the compressor's performance. Through efficient usage of the recovered energy, you bring about important energy cost savings and obtain a high return on investment.

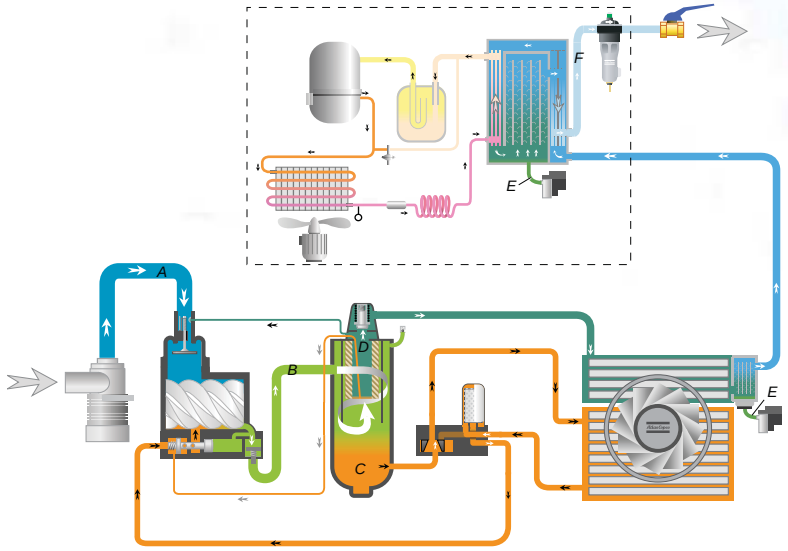


ENERGY RECOVERY APPLICATIONS

- Auxiliary or main heating of warehouses, workshops etc.
- Industrial process heating.
- Water heating for laundries, industrial cleaning and sanitary facilities.
- Canteens and large kitchens.
- Food industry.
- Chemical and pharmaceutical industries.
- Drying processes.

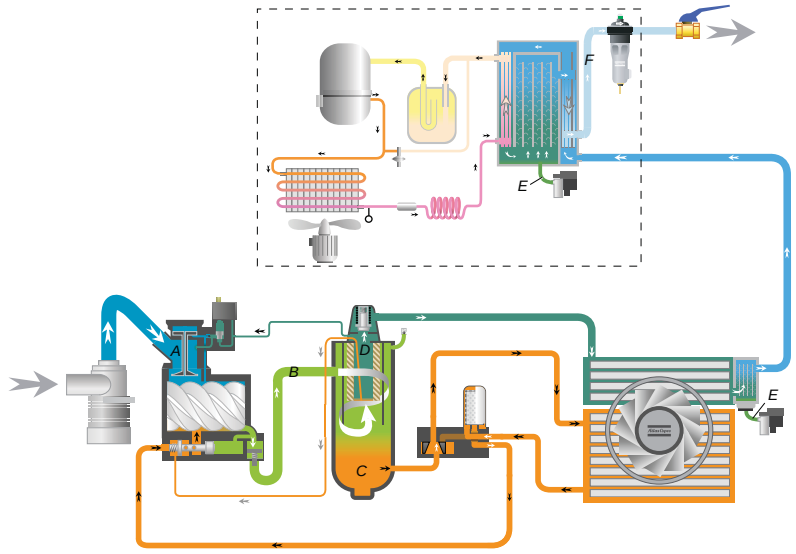
Flow charts

VARIABLE SPEED DRIVE: GA VSD



- **A** Intake air
- **B** Air/oil mixture
- **C** Oil
- **D** Wet compressed air
- **E** Condensate
- **F** Dried compressed air

FIXED SPEED: GA+ & GA



- **A** Intake air
- **B** Air/oil mixture
- **C** Oil
- **D** Wet compressed air
- **E** Condensate
- **F** Dried compressed air

GA 37, 45 VSD	Width 1766 mm, 69.5"
GA 30+, 37+, 45+	Depth 970 mm, 38.2"
GA 37, 45	Height 1800 mm, 70.9"
GA 55, 75, 90 VSD	Width 2248 mm, 88.5"
GA 55+, 75+	Depth 1080 mm, 42.5"
GA 55, 75, 90	Height 1955 mm, 76.9"



Technical specifications GA 30+-90 (50 Hz versions)

COMPRESSOR TYPE	Pressure variant	Max. working pressure WorkPlace		Capacity FAD*			Installed motor power		Noise level**	Weight WorkPlace		Weight WorkPlace Full Feature	
		bar(e)	psig	l/s	m³/min	cfm	kW	hp	dB(A)	kg	lbs	kg	lbs
GA 30+	7.5	7.5	109	99	5.9	209	30	40	65	817	1801	898	1980
	8.5	8.5	123	90	5.4	191	30	40	65	817	1801	898	1980
	10	10	145	82	4.9	175	30	40	65	817	1801	898	1980
	13	13	189	71	4.3	151	30	40	65	817	1801	898	1980
GA 37	7.5	7.5	109	115	6.9	243	37	50	69	905	1994	820	1807
	8.5	8.5	123	106	6.4	225	37	50	69	905	1995	820	1808
	10	10	145	100	6.0	213	37	50	69	905	1995	820	1808
	13	13	189	81	4.9	172	37	50	69	905	1995	820	1808
GA 37+	7.5	7.5	109	122	7.3	258	37	50	65	902	1989	987	2176
	8.5	8.5	123	118	7.1	250	37	50	65	902	1989	987	2176
	10	10	145	102	6.1	216	37	50	65	902	1989	987	2176
	13	13	189	85	5.1	180	37	50	65	902	1989	987	2176
GA 45	7.5	7.5	109	137	8.2	291	45	60	72	894	1971	979	2158
	8.5	8.5	123	127	7.6	268	45	60	72	894	1971	979	2158
	10	10	145	117	7.0	248	45	60	72	894	1971	979	2158
	13	13	189	102	6.1	217	45	60	72	894	1971	979	2158
GA 45+	7.5	7.5	109	149	8.9	315	45	60	66	970	2138	1060	2337
	8.5	8.5	123	139	8.3	295	45	60	66	970	2138	1060	2337
	10	10	145	128	7.7	270	45	60	66	970	2138	1060	2337
	13	13	189	106	6.4	225	45	60	66	970	2138	1060	2337
GA 55	7.5	7.5	109	169	10.2	359	55	75	69	1229	2709	1329	2930
	8.5	8.5	123	159	9.5	336	55	75	69	1229	2709	1329	2930
	10	10	145	148	8.9	313	55	75	69	1229	2709	1329	2930
	13	13	189	126	7.6	267	55	75	69	1229	2709	1329	2930
GA 55+	7.5	7.5	109	184	11.1	390	55	75	66	1358	2994	1458	3214
	8.5	8.5	123	174	10.4	369	55	75	66	1358	2994	1458	3214
	10	10	145	156	9.5	331	55	75	66	1358	2994	1458	3214
GA 75	7.5	7.5	109	226	13.5	478	75	100	73	1259	2776	1379	3040
	8.5	8.5	123	209	12.6	444	75	100	73	1259	2776	1379	3040
	10	10	145	189	11.4	401	75	100	73	1259	2776	1379	3040
	13	13	189	162	9.7	344	75	100	73	1259	2776	1379	3040
GA 75+	7.5	7.5	109	248	14.9	526	75	100	68	1413	3115	1533	3380
	8.5	8.5	123	235	14.1	497	75	100	68	1413	3115	1533	3380
	10	10	145	210	12.6	445	75	100	68	1413	3115	1533	3380
	13	13	189	177	10.6	375	75	100	68	1413	3115	1533	3380
GA 90	7.5	7.5	109	281	16.9	596	90	125	73	1425	3142	1545	3406
	8.5	8.5	123	275	16.5	582	90	125	73	1425	3142	1545	3406
	10	10	145	250	15.0	529	90	125	73	1425	3142	1545	3406
	13	13	189	216	13.0	458	90	125	73	1425	3142	1545	3406

** Unit performance measured according to ISO 1217, Annex C, Edition 4*

Reference conditions:

- *Absolute inlet pressure 1 bar (14.5 psi)*
- *Intake air temperature 20°C, 68°F*

FAD is measured at the following working pressures:

- *7.5 bar versions at 7 bar*
- *8.5 bar versions at 8 bar*
- *10 bar versions at 9.5 bar*
- *13 bar versions at 12.5 bar*

*** A-weighted emission sound pressure level at the work station, Lp WSA (re 20 µPa) dB (with uncertainty 3 dB).*
Values determined according to noise level test code ISO 2151 and noise measurement standard ISO 9614.
Pressure dew point of integrated refrigerant dryer at reference conditions: 2°C to 3°C, 36°F to 37°F.



Technical specifications GA 30+-90 (60 Hz versions)

COMPRESSOR TYPE	Pressure variant	Max. working pressure WorkPlace		Capacity FAD*			Installed motor power		Noise level**	Weight WorkPlace		Weight WorkPlace Full Feature	
		bar(e)	psig	l/s	m³/min	cfm	kW	hp	dB(A)	kg	lbs	kg	lbs
GA 30+	100	7.4	107	100	6.0	212	30	40	65	817	1801	898	1980
	125	9.1	132	91	5.4	192	30	40	65	817	1801	898	1980
	150	10.8	157	82	4.9	174	30	40	65	817	1801	898	1980
	175	12.5	181	75	4.5	158	30	40	65	817	1801	898	1980
GA 37	100	7.4	107	116	7.0	246	37	50	69	905	1995	820	1808
	125	9.1	132	108	6.5	229	37	50	69	905	1995	820	1808
	150	10.8	157	96	5.8	204	37	50	69	905	1995	820	1808
	175	12.5	181	87	5.2	185	37	50	69	905	1995	820	1808
GA 37+	100	7.4	107	120	7.2	255	37	50	65	905	1995	987	2176
	125	9.1	132	111	6.6	234	37	50	65	905	1995	987	2176
	150	10.8	157	100	6.0	212	37	50	65	905	1995	987	2176
	175	12.5	181	91	5.4	192	37	50	65	905	1995	987	2176
GA 45	100	7.4	107	139	8.3	294	45	60	72	894	1971	979	2158
	125	9.1	132	128	7.7	271	45	60	72	894	1971	979	2158
	150	10.8	157	118	7.1	250	45	60	72	894	1971	979	2158
	175	12.5	181	105	6.3	222	45	60	72	894	1971	979	2158
GA 45+	100	7.4	107	146	8.8	310	45	60	66	970	2138	1060	2337
	125	9.1	132	134	8.0	284	45	60	66	970	2138	1060	2337
	150	10.8	157	126	7.5	266	45	60	66	970	2138	1060	2337
	175	12.5	181	111	6.7	236	45	60	66	970	2138	1060	2337
GA 55	100	7.4	107	174	10.5	369	55	75	69	1229	2709	1329	2930
	125	9.1	132	154	9.3	327	55	75	69	1229	2709	1329	2930
	150	10.8	157	142	8.5	300	55	75	69	1229	2709	1329	2930
	175	12.5	181	128	7.7	272	55	75	69	1229	2709	1329	2930
GA 55+	100	7.4	107	184	11.0	390	55	75	67	1358	2994	1458	3214
	125	9.1	132	166	10.0	352	55	75	67	1358	2994	1458	3214
	150	10.8	157	141	8.5	299	55	75	67	1358	2994	1458	3214
GA 75	100	7.4	107	229	13.7	485	75	100	73	1259	2776	1359	2996
	125	9.1	132	200	12.0	424	75	100	73	1259	2776	1359	2996
	150	10.8	157	189	11.4	401	75	100	73	1259	2776	1359	2996
	175	12.5	181	169	10.1	358	75	100	73	1259	2776	1359	2996
GA 75+	100	7.4	107	248	14.9	525	75	100	69	1413	3115	1533	3380
	125	9.1	132	227	13.6	481	75	100	69	1413	3115	1533	3380
	150	10.8	157	204	12.3	433	75	100	69	1413	3115	1533	3380
	175	12.5	181	182	10.9	385	75	100	69	1413	3115	1533	3380
GA 90	100	7.4	107	289	17.4	613	90	125	74	1425	3142	1545	3406
	125	9.1	132	267	16.0	565	90	125	74	1425	3142	1545	3406
	150	10.8	157	250	15.0	530	90	125	74	1425	3142	1545	3406
	175	12.5	181	228	13.7	484	90	125	74	1425	3142	1545	3406

Please refer to the footnotes, reference conditions and FAD details of the 50 Hz versions.

Technical specifications GA 37-90 VSD (50/60 Hz versions)

COMPRESSOR TYPE	Working pressure		Capacity FAD*						Installed motor power		Noise level**	Weight WorkPlace		Weight WorkPlace Full Feature	
			l/s		m³/min		cfm								
	bar(e)	psig	min	max	min	max	min	max	kW	hp	dB(A)	kg	lbs	kg	lbs
GA 37 VSD	4	58	26.0	124	1.6	7.4	55	263	37	50	66/67	1042	2297	1127	2485
	7	102	26.0	123	1.6	7.4	55	260	37	50	66/67	1042	2297	1127	2485
	10	145	25.8	107	1.5	6.4	55	226	37	50	66/67	1042	2297	1127	2485
	13	189	40.3	87	2.4	5.2	85	185	37	50	66/67	1042	2297	1127	2485
GA 45 VSD	4	58	26.0	146	1.6	8.8	55	310	45	60	69/72	1100	2425	1190	2624
	7	102	26.0	145	1.6	8.7	55	307	45	60	69/72	1100	2425	1190	2624
	10	145	25.8	128	1.5	7.7	55	271	45	60	69/72	1100	2425	1190	2624
	13	189	40.3	107	2.4	6.4	85	226	45	60	69/72	1100	2425	1190	2624
GA 55 VSD	4	58	32.4	197	1.9	11.8	69	418	55	75	69/72	1380	3042	1480	3263
	7	102	26.0	175	1.6	10.5	55	371	55	75	69/72	1380	3042	1480	3263
	10	145	25.4	155	1.5	9.3	54	328	55	75	69/72	1380	3042	1480	3263
	13	189	37.0	129	2.2	7.7	78	273	55	75	69/72	1380	3042	1480	3263
GA 75 VSD	4	58	37.8	250	2.3	15.0	80	529	75	100	69/70	1534	3382	1654	3646
	7	102	37.4	250	2.2	15.0	79	530	75	100	69/70	1534	3382	1654	3646
	10	145	48.1	219	2.9	13.2	102	465	75	100	69/70	1534	3382	1654	3646
	13	189	58.3	182	3.5	10.9	124	386	75	100	69/70	1534	3382	1654	3646
GA 90 VSD	4	58	37.0	293	2.2	17.6	78	621	90	125	73/74	1534	3382	1654	3646
	7	102	39.4	292	2.4	17.5	84	619	90	125	73/74	1534	3382	1654	3646
	10	145	48.3	257	2.9	15.4	102	545	90	125	73/74	1534	3382	1654	3646
	13	189	59.4	214	3.6	12.9	126	454	90	125	73/74	1534	3382	1654	3646

** Unit performance measured according to ISO 1217, Annex E, Edition 4*
Maximum working pressure for VSD machines: 13 bar(e) (188 psig)



Driven by innovation

With more than 135 years of innovation and experience, Atlas Copco will deliver the products and services to help maximize your company's efficiency and productivity. As an industry leader, we are dedicated to offering high air quality at the lowest possible cost of ownership. Through continuous innovation, we strive to safeguard your bottom line and bring you peace of mind.



Building on interaction

As part of our long-term relationship with our customers, we have accumulated extensive knowledge of a wide diversity of processes, needs and objectives. This gives us the flexibility to adapt and efficiently produce customized compressed air solutions that meet and exceed your expectations.



A committed business partner

With a presence in over 170 countries, we will deliver high-quality customer service anywhere, anytime. Our highly skilled technicians are available 24/7 and are supported by an efficient logistics organization, ensuring fast delivery of genuine spare parts when you need them. We are committed to providing the best possible know-how and technology to help your company produce, grow, and succeed. With Atlas Copco you can rest assured that your superior productivity is our first concern!

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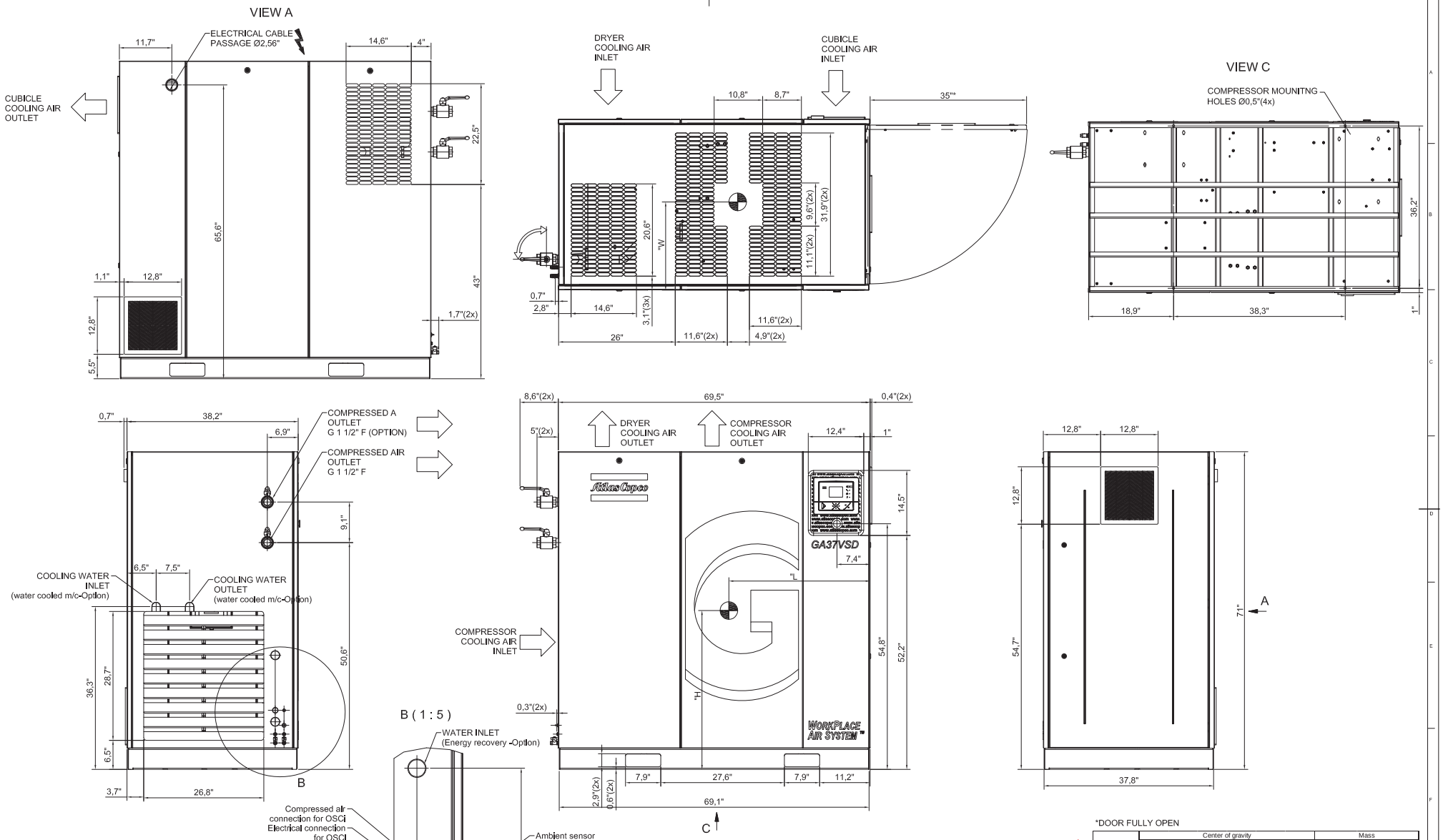
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*DOOR FULLY OPEN

	Center of gravity						Mass	
	with dryer			without dryer			with dryer	without dryer
	L	W	H	L	W	H		
GA37VSD	35,43	21,06	31,54	33,74	21,14	30,08	2485	2297
GA45VSD	35,51	21,06	31,57	33,74	21,14	30,08	2624	2425
GA37VSD 200	32,09	19,33	28,11	30,47	19,29	26,65	2915	2727
GA37VSD 575	33,58	20,12	29,65	35,43	21,06	31,54	2705	2518
GA45VSD 575	33,35	19,96	29,37	31,61	19,96	27,83	2888	2690
Dimensions in inch: +/- 2 Inch							MASS in lbs(oil included): +/- 110lbs	

CONFIDENTIAL:

Note	Position	Modified from	Date	Init./Appd.
00			2012-04-19	

Attention : 3rd angle projection is used

All materials supplied are in compliance with the requirements of the List of Prohibited Substances

Parent 3D Model	Ed, Version 3D

ATLAS COPCO STANDARD/Classed/Class

Name	DIMENS. DRWG	GA30+-45+ VSD	Secrecy Class
Material	NOT APPLICABLE	1102 K/ 3	
Treatment	Not Applicable	ACD	
Scale	1:10	Family	A1
Drawn by	sraman	Blank w.	Replaces
Version Drwg	00	Blank wt. 0 Kg	Rev.w. 2.06000006277
Dim. checked		Prod checked	Approved
Approved		Date	2012-04-19

Compare | Drawing owner: All | Sheet: () 04 01

9820 9790 03

Atlas Copco

Electronic condensate drains



EWD 50 B, EWD 16K C, EWD 330, EWD 50 A, EWD 75 C EHP, EWD 1500 C, EWD 50 L, EWD 50, EWD 75 C, EWD 75, EWD 330 M, EWD 1500, EWD 330 M E, EWD 330 M C, EWD 330 M B, EWD 330 E, EWD 330 D, EWD 330 C, EWD 330 C HP, EWD 330 B, EWD 330 B E

Instruction book

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Electronic condensate drains

EWD 50 B, EWD 16K C, EWD 330, EWD 50 A, EWD 75 C EHP, EWD 1500 C, EWD 50 L, EWD 50, EWD 75 C, EWD 75, EWD 330 M, EWD 1500, EWD 330 M E, EWD 330 M C, EWD 330 M B, EWD 330 E, EWD 330 D, EWD 330 C, EWD 330 C HP, EWD 330 B, EWD 330 B E

Instruction book

Original instructions

Copyright notice

Any unauthorized use or copying of the contents or any part thereof is prohibited.

This applies in particular to trademarks, model denominations, part numbers and drawings.

This instruction book is valid for CE as well as non-CE labelled machines. It meets the requirements for instructions specified by the applicable European directives as identified in the Declaration of Conformity.

2013 - 10

No. 2920 7109 90

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1 Safety precautions

1.1 Safety icons

Explanation

	Danger for life
	Warning
	Important note

1.2 Safety precautions

Warning

	All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by Atlas Copco.

General precautions

1. The operator must employ safe working practices and observe all related local work safety requirements and regulations.
2. If any of the following statements does not comply with local legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair shall only be performed by authorised, trained, competent personnel.

Precautions during installation, maintenance and repair

1. Always wear safety glasses.
2. Use the correct tools for maintenance and repair work.
3. Air hoses must be of the correct size and be suitable for the working pressure. Never use frayed, damaged or worn hoses. Distribution pipes and connections must be of the correct size and be suitable for the working pressure.
4. The electrical connections must correspond to the local codes.
5. Use only genuine spare parts.
6. Do not exceed the maximum operating pressure. Maintenance work may only be carried out when the device is not under pressure.
7. Only use pressure-proof installation material. The feed line must be firmly fixed. The discharge line should be a short pressure hose or a pressure-proof pipe. Ensure that the condensate cannot squirt onto persons or objects.
8. Avoid excessive tightening of the connectors on the inlet and outlet. When tightening the connectors, two keys have to be used: one to hold the valve, the other to tighten the nut.

9. In areas where freezing temperatures are expected, the device should be provided with thermostatically controlled heating (optional equipment).
10. All maintenance work must only be undertaken when the device is in a de-energized condition.
11. A sign with a warning such as "work in progress; do not start" must be attached to the starting equipment.
12. Persons switching on remotely controlled machines must take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice must be affixed to the remote starting equipment.
13. Before removing any pressurized components, effectively isolate the device from all sources of pressure and relieve the system of pressure.
14. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against the toxic vapours of cleaning liquids.
15. Scrupulously observe cleanliness during maintenance and repair work. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.
16. Never use a light source with open flame for inspecting the interior of a device.
17. The electronic drain valve will only function when voltage is being supplied to the device.
18. Do not use the test button for continuous draining.
19. Do not use the electronic drain valve in hazardous areas (with potentially explosive atmospheres).
20. During electric installation, all regulations in force need to be adhered to (e.g. VDE 0100 / IEC 60364).

Note

	Some precautions are general and may not apply to your device.

2 General description

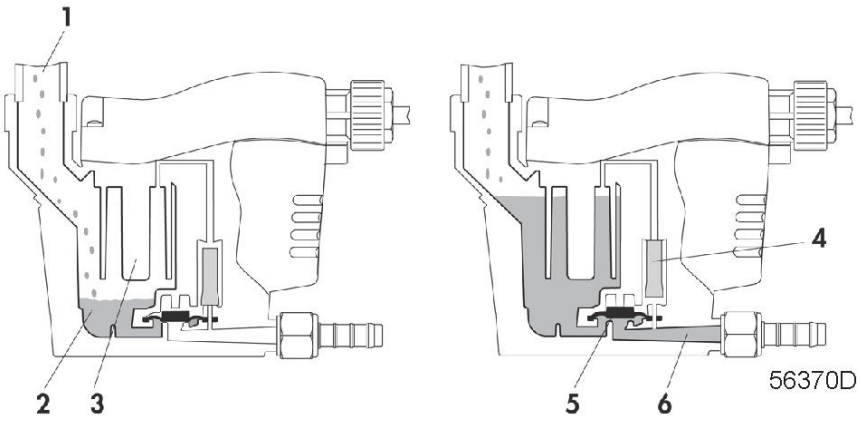
2.1 Functional description

General

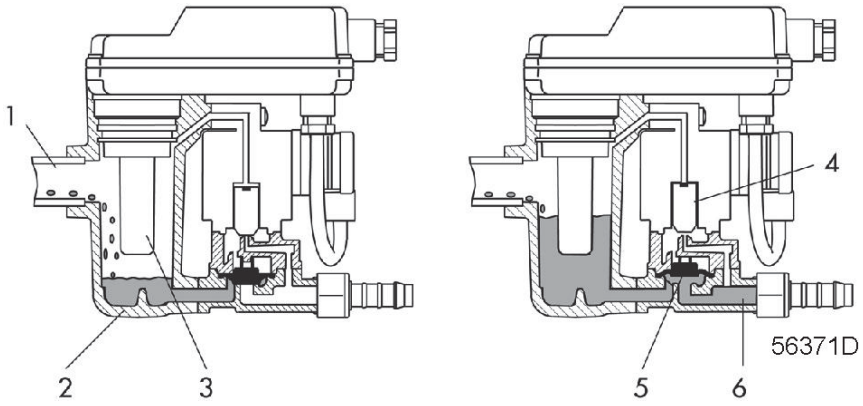
The Electronic Water Drain (EWD) is a zero-loss, electronically operated drain valve, specially designed to drain condensate. EWD's exist in a number of variants and sizes. Below table explains the abbreviations used in the type designation.

Suffix	Designation
- (blank)/ Std	• EWD 50: without alarm contact • EWD 75, EWD 330, EWD 1500, EWD 16K: with alarm contact
A	With alarm contact (only EWD 50)
B	Delay of approximately 20 s before draining the condensate, with alarm contact.
C	Internally coated, with alarm contact
E	External test signal (forced draining by PLC or Elektronikon possible)
D	Combination of options 'C' and 'E'
M	With extra support, electric cable and manual drain outlet
HP	High pressure version (25 bar (360 psi))
EHP	Extra high pressure version (63 bar (910 psi))
L	Combination of options 'B' and 'E' (only EWD 50)

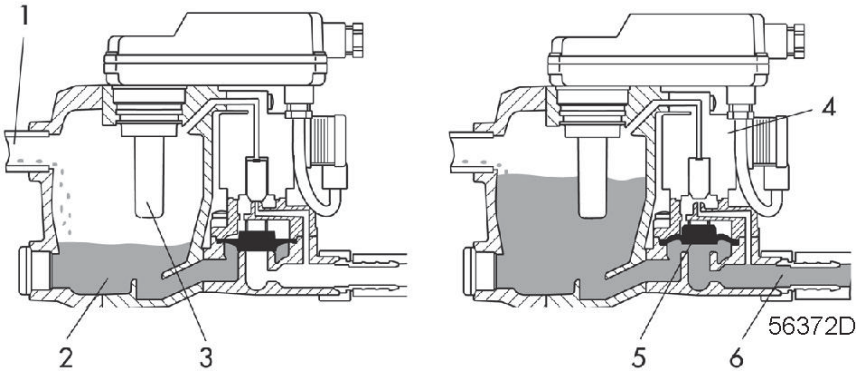
EWD 50, EWD 75, EWD 330, EWD 1500 and EWD 16K



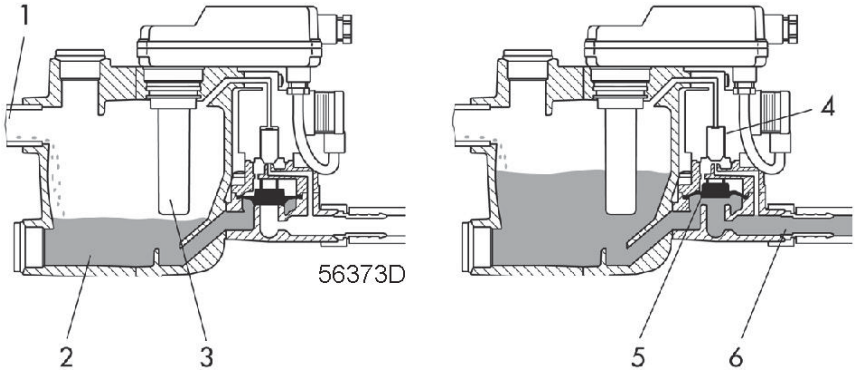
Condensate flow, EWD 50



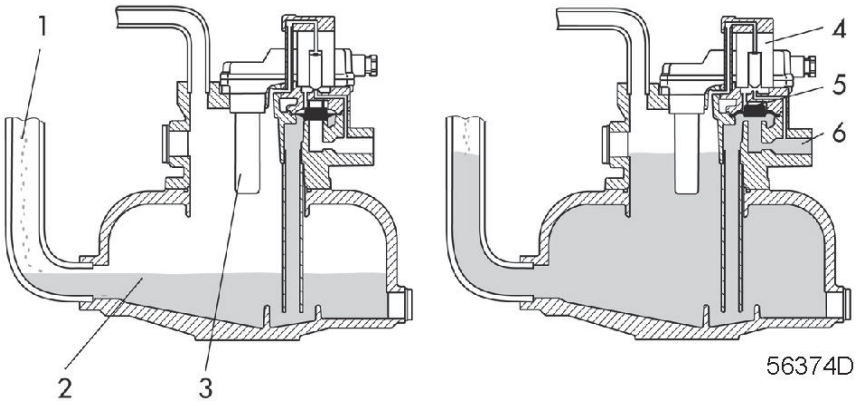
Condensate flow, EWD 75



Condensate flow, EWD 330



Condensate flow, EWD 1500



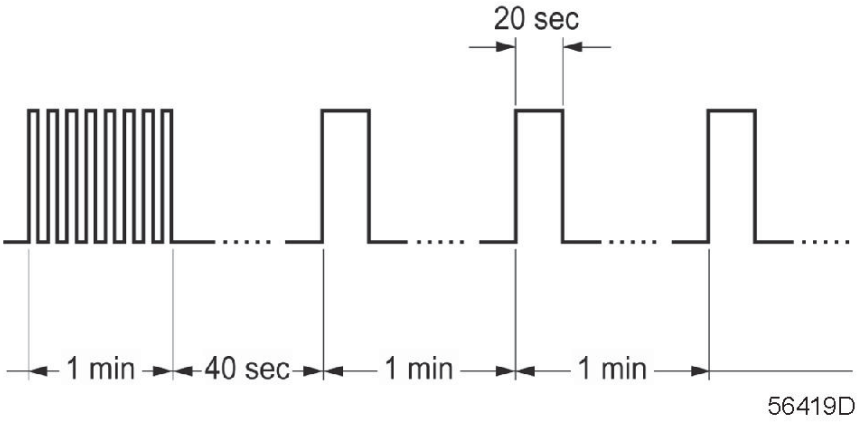
Condensate flow, EWD 16K

Operation

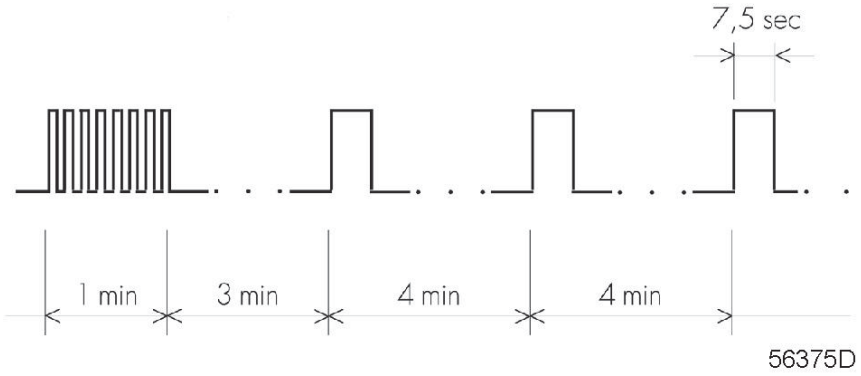
The condensate enters the Electronic Water Drain (EWD) via inlet (1) and accumulates in collector (2). A capacitive sensor (3) continuously measures the liquid level. As soon as the collector is filled up to a certain level, pilot valve (4) is activated and diaphragm (5) opens outlet (6), discharging the condensate. Once the collector has been emptied, the outlet closes quickly without wasting compressed air.

Alarm mode

In case of a malfunction, the red alarm LED starts flashing and the electronic drain valve will automatically change to the alarm mode, opening and closing the valve according to a sequence as indicated below.



Switching sequence in the event of a malfunction, EWD 50 B and EWD 50 L

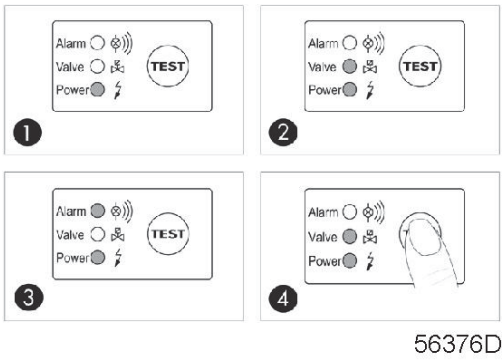


Switching sequence in the event of a malfunction (EWD 50 Std, EWD 50 A, EWD 75, EWD 330, EWD 1500 and EWD 16K)

This condition continues until the fault is remedied. Once the fault is cleared, the EWD will automatically return to the normal mode of operation. If the fault is not remedied automatically, maintenance is required.

2.2 LED indications

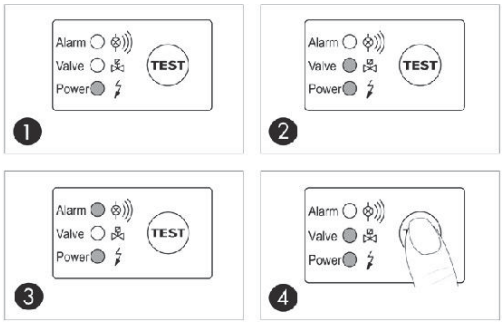
EWD 50, EWD 75, EWD 330, EWD 1500, EWD 16K:



Reference	Description
1	Ready for operation. Power is on.
2	The outlet line is open.
3	The alarm mode is activated.
4	Test of valve function and manual draining: briefly press button. Test of alarm function: press button for > 1 minute (see section Testing the electronic drain valve).

2.3 Testing the electronic drain valve

Testing



Control panel of EWD 50, EWD 75, EWD 330, EWD 1500 and EWD 16K

Functional test

Briefly press the TEST button and check that the valve opens for condensate discharge.

Checking the alarm signal

- Close the condensate inlet.
- Press the TEST button for at least 1 minute.
- Check that the alarm LED (red) flashes.
- Check that the alarm signal is being relayed (if connected).

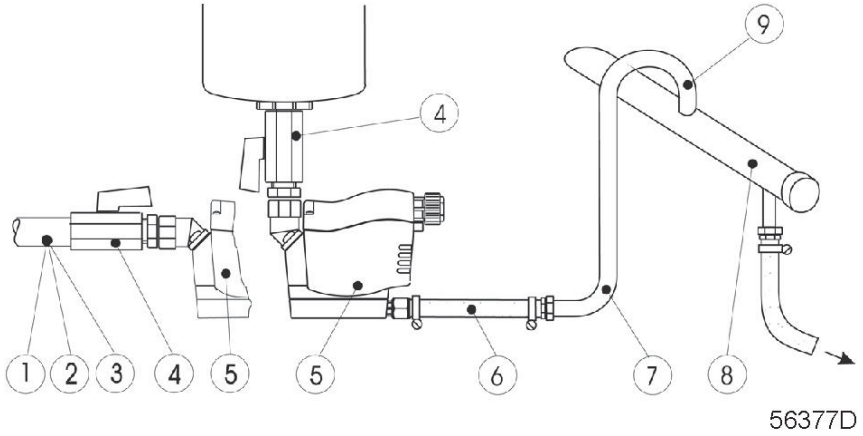
Release the TEST button and reopen the condensate inlet after the test.

3 Installation

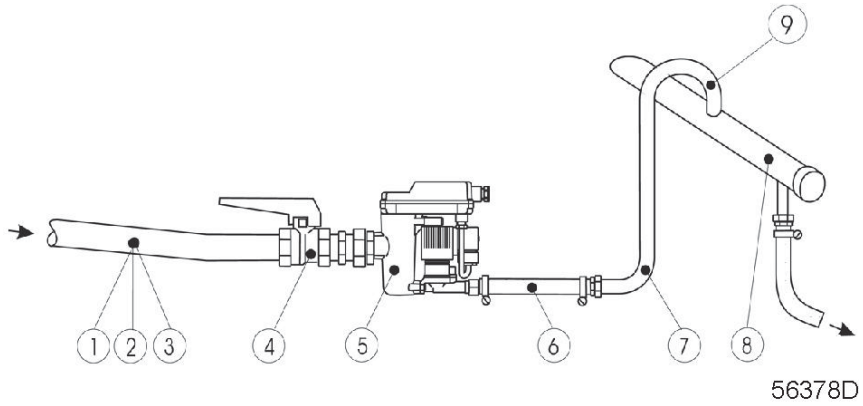
3.1 Installation proposal

Example of installation

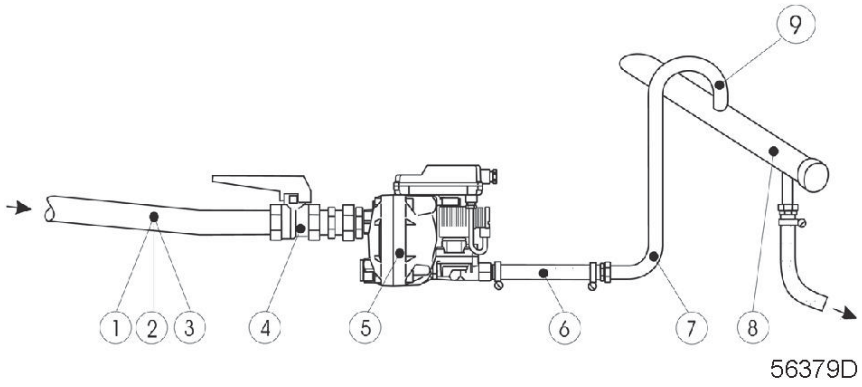
	Always observe the safety precautions mentioned at the beginning of this Instruction Book. Do not exceed the maximum operating pressure (see type plate)! CAUTION ! Maintenance work must only be carried out when the device is not under pressure ! Only use pressure-proof installation materials! The feed line must be firmly fixed. Outlet line: short pressure hose to pressure-proof pipe. Ensure that condensate cannot squirt onto persons or objects.



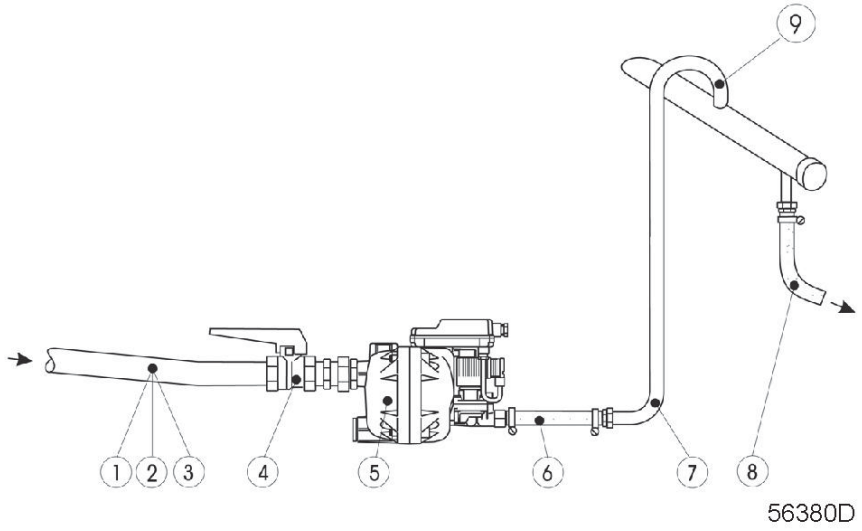
EWD 50



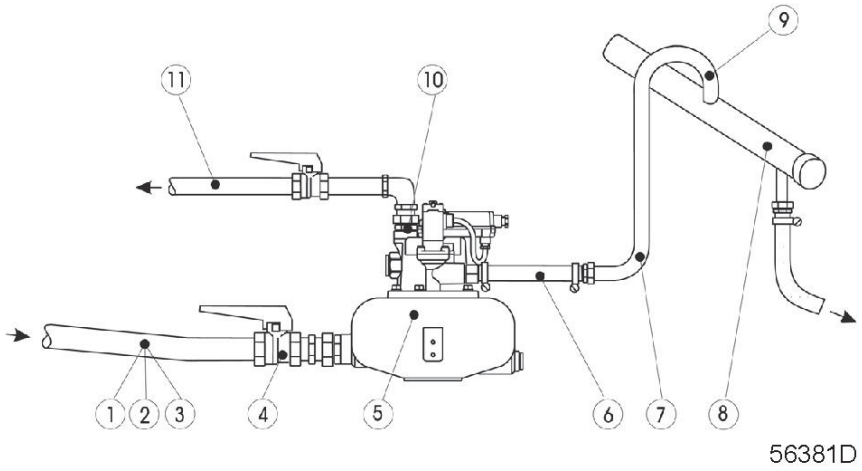
EWD 75



EWD 330



EWD 1500



EWD 16K

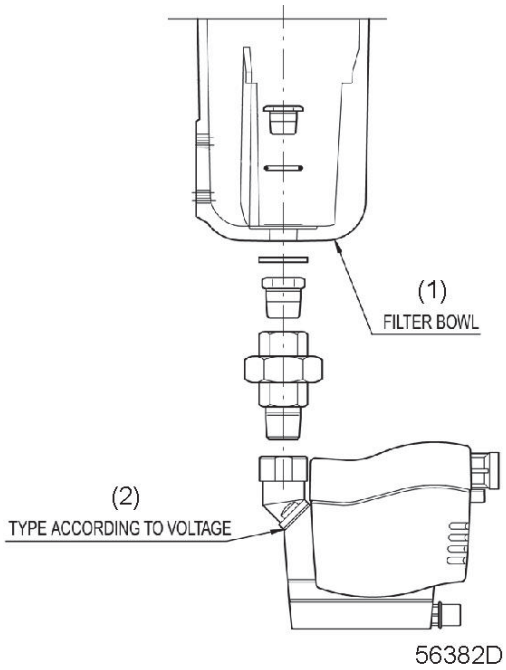
Description

Reference	Description
1	The feed pipe must have a minimum diameter. See section Electronic Water Drain data.
2	No filters should be installed in the feed line.
3	The feed line must have a slope of at least 1 %.
4	Only use ball valves in the feed line.
5	A minimum pressure must be present inside the electronic drain valve. See section Reference conditions and limitations.
6	The pressure hose used must be as short as possible.
7	For each meter (3.281 ft) of rising slope in the outlet line, the required minimum pressure will increase by 0.1 bar (1.45 psi). The rise of the outlet line may not exceed 5 metres (16.405 ft).
8	• The collecting line must have a minimum diameter. See section Electronic Water Drain data. • The collecting line must have a slope of at least 1 %.
9	Lead the discharge pipe from the top into the collecting line.
10 (EWD 16K)	The upper 3/4 “ connection should only be used as a condensate inlet in exceptional cases since this could lead to inflow problems.
11 (EWD 16K)	Always install a venting line.

Remarks

	Install a venting line if there are inflow problems.
	The feed line can be installed horizontally or vertically on the EWD 50.
	The necessary system storage volume for the EWD 50 B and EWD 50 L comprises collecting space, feed pipe (1), ball valve (4) and Electronic Water Drain (EWD) (5).

Installation on filter (EWD 50 L)

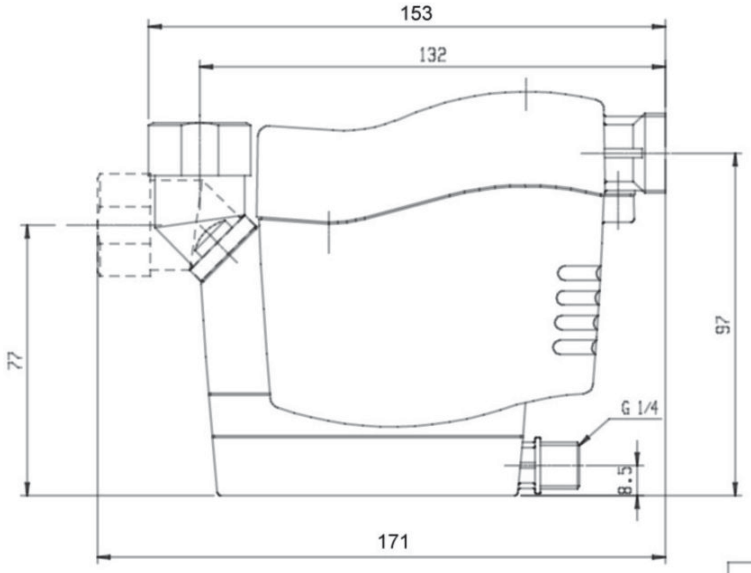


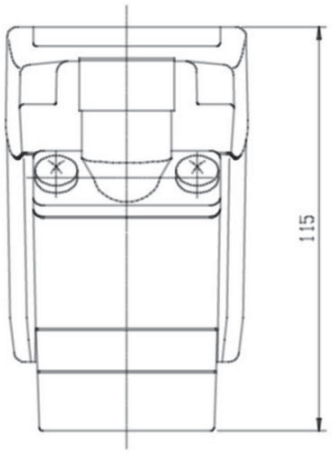
Text on drawing

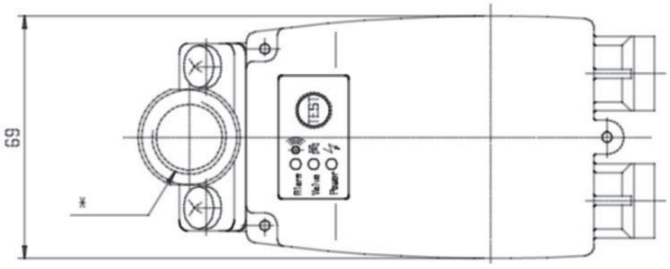
Reference	Name
1	Filter bowl
2	Type according to voltage

3.2 Dimension drawings

EWD 50



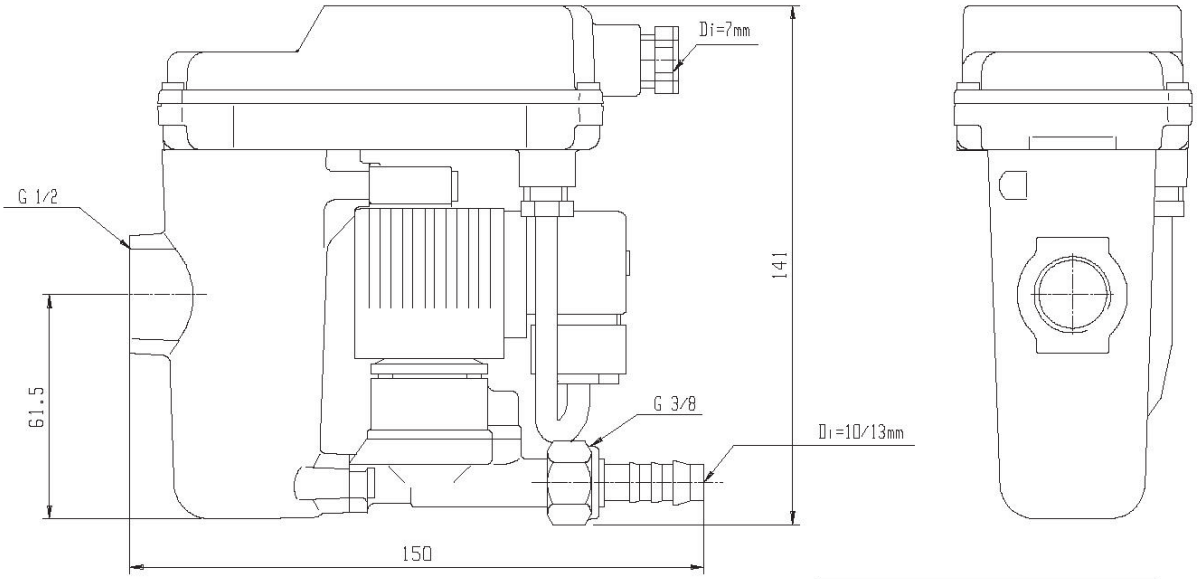


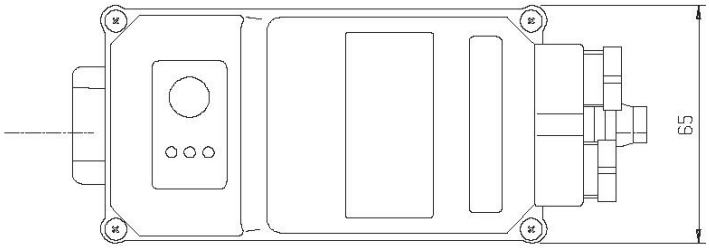


			*
EWD 50	230 V	(50 - 60 Hz)	G 1/2
EWD 50	110 V	(50 - 60 Hz)	G 1/2
EWD 50	24 V	(50 - 60 Hz)	
EWD 50	110 V NPT	(50 - 60 Hz)	1/2 14 NPT
EWD 50 A	230 V	(50 - 60 Hz)	G 1/2
EWD 50 A	110 V	(50 - 60 Hz)	G 1/2
EWD 50 A	24 V	(50 - 60 Hz)	G 1/2
EWD 50 A	110 V NPT	(50 - 60 Hz)	1/2 14 NPT
EWD 50 B	230 V	(50 - 60 Hz)	G 1/2
EWD 50 B	110 V	(50 - 60 Hz)	G 1/2
EWD 50 B	24 V	(50 - 60 Hz)	G 1/2
EWD 50 B	110 V NPT	(50 - 60 Hz)	1/2 14 NPT
EWD 50 L	230 V	(50 - 60 Hz)	
EWD 50 L	110 V	(50 - 60 Hz)	
EWD 50 L	124 V	(50 - 60 Hz)	

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56388D

EWD 75



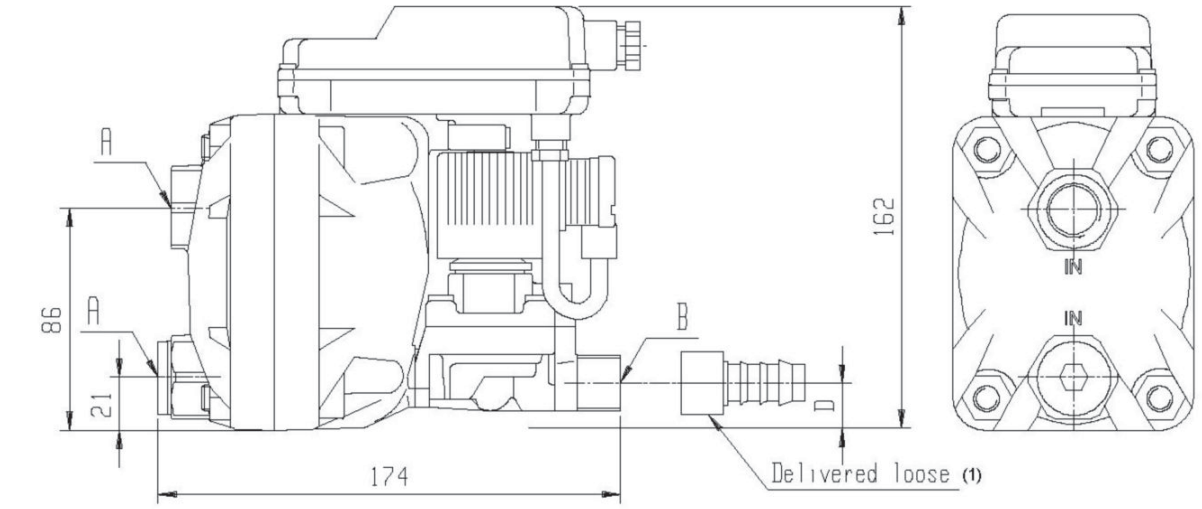


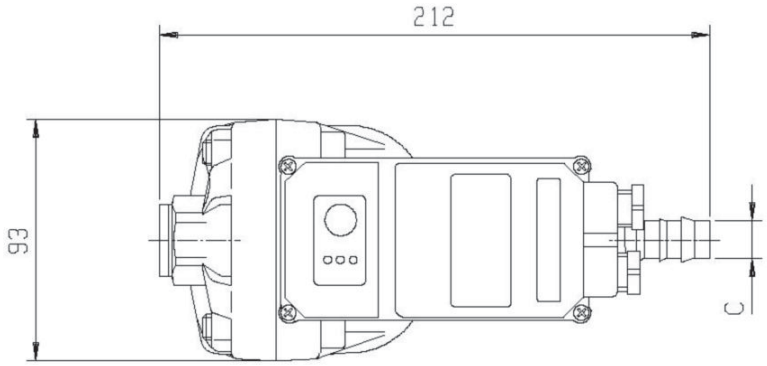
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EWD 75	230 V	(50 - 60 Hz)
EWD 75	110 V	(50 - 60 Hz)
EWD 75	24 V	(50 - 60 Hz)
EWD 75	110 V NPT	(50 - 60 Hz)
EWD 75 C	230 V	(50 - 60 Hz)
EWD 75 C	110 V	(50 - 60 Hz)
EWD 75 C	24 V	(50 - 60 Hz)
EWD 75 C	24 V (1) external test contact	(50 - 60 Hz)
EWD 75 C	110 V NPT	(50 - 60 Hz)
EWD 75 C EHP	230 V	(50 - 60 Hz)
EWD 75 C EHP	110 V	(50 - 60 Hz)
EWD 75 C EHP	24 V	(50 - 60 Hz)
EWD 75 C EHP	110 V NPT	(50 - 60 Hz)
EWD 75 C EHP	24 V (2) extra high pressure coated	(50 - 60 Hz)

Reference	Name
1	External test contact
2	Extra high pressure coated

EWD 330





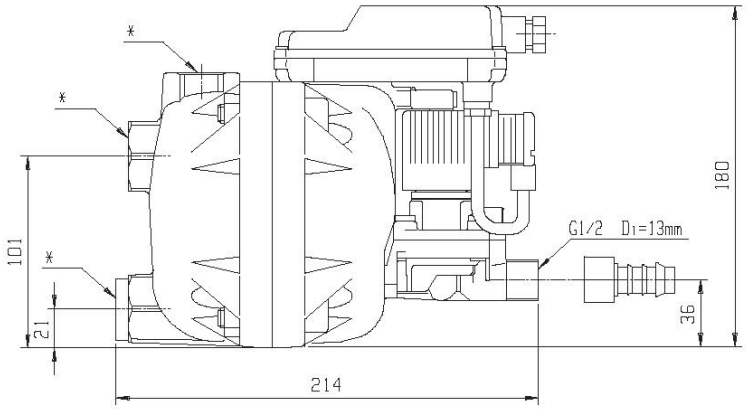
			A	B	C	D
EWD 330	230 V	(50 - 60 Hz)	G 1/2"	G 1/2"	Ø 12	18
EWD 330	110 V	(50 - 60 Hz)	G 1/2"	G 1/2"	Ø 12	18
EWD 330	24 V	(50 - 60 Hz)	G 1/2"	G 1/2"	Ø 12	18
EWD 330	110 V NPT	(50 - 60 Hz)	NPT 1/2"	G 1/2"	Ø 12	18
EWD 330 C	230 V	(50 - 60 Hz)	G 1/2"	G 1/2"	Ø 12	18
EWD 330 C	110 V	(50 - 60 Hz)	G 1/2"	G 1/2"	Ø 12	18
EWD 330 C	24 V	(50 - 60 Hz)	G 1/2"	G 1/2"	Ø 12	18
EWD 330 C	110 V NPT	(50 - 60 Hz)	NPT 1/2"	G 1/2"	Ø 12	18
EWD 330 C HP	230 V	(50 - 60 Hz)	G 1/2"	G 3/8"	Ø 13	22
EWD 330 C HP	110 V	(50 - 60 Hz)	G 1/2"	G 3/8"	Ø 13	22
EWD 330 C HP	24 V	(50 - 60 Hz)	G 1/2"	G 3/8"	Ø 13	22
EWD 330 C HP	110 V NPT	(50 - 60 Hz)	NPT 1/2"	G 3/8"	Ø 13	22

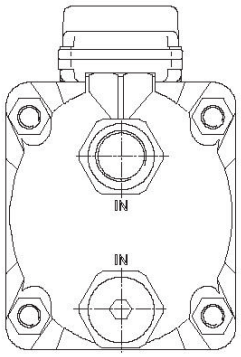
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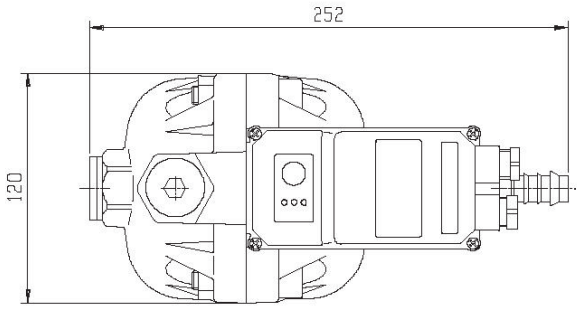
Reference	Name
1	Delivered loose

	The data on the drawing for the EWD 330 C are the same for the EWD 330 D variant.

EWD 1500



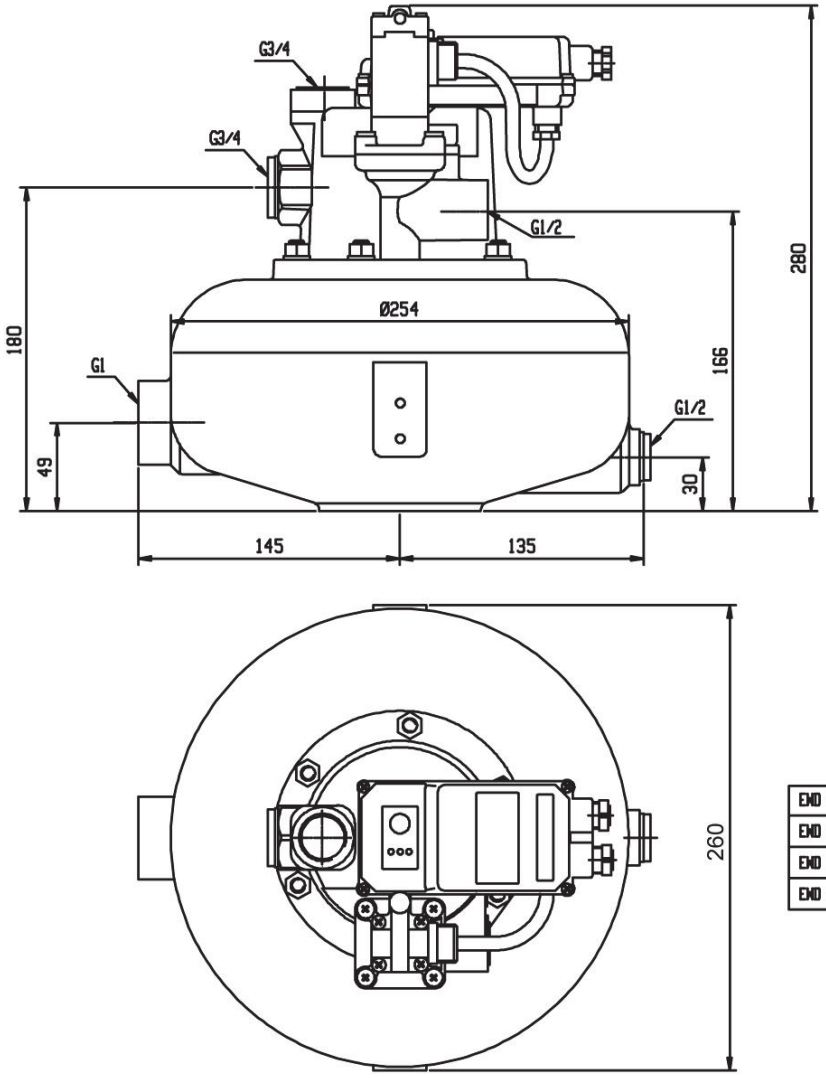




			*
EWD 1500	230 V	(50 - 60 Hz)	G 3/4"
EWD 1500	110 V	(50 - 60 Hz)	G 3/4"
EWD 1500	24 V	(50 - 60 Hz)	G 3/4"
EWD 1500	110 V NPT	(50 - 60 Hz)	NPT 3/4"
EWD 1500 C	230 V	(50 - 60 Hz)	NPT 3/4"
EWD 1500 C	110 V	(50 - 60 Hz)	NPT 3/4"
EWD 1500 C	24 V	(50 - 60 Hz)	NPT 3/4"
EWD 1500 C	110 V NPT	(50 - 60 Hz)	NPT 3/4"
EWD 1500	24 V DC		G 3/4"
EWD 1500 C	24 V DC		G 3/4"

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EWD 16K

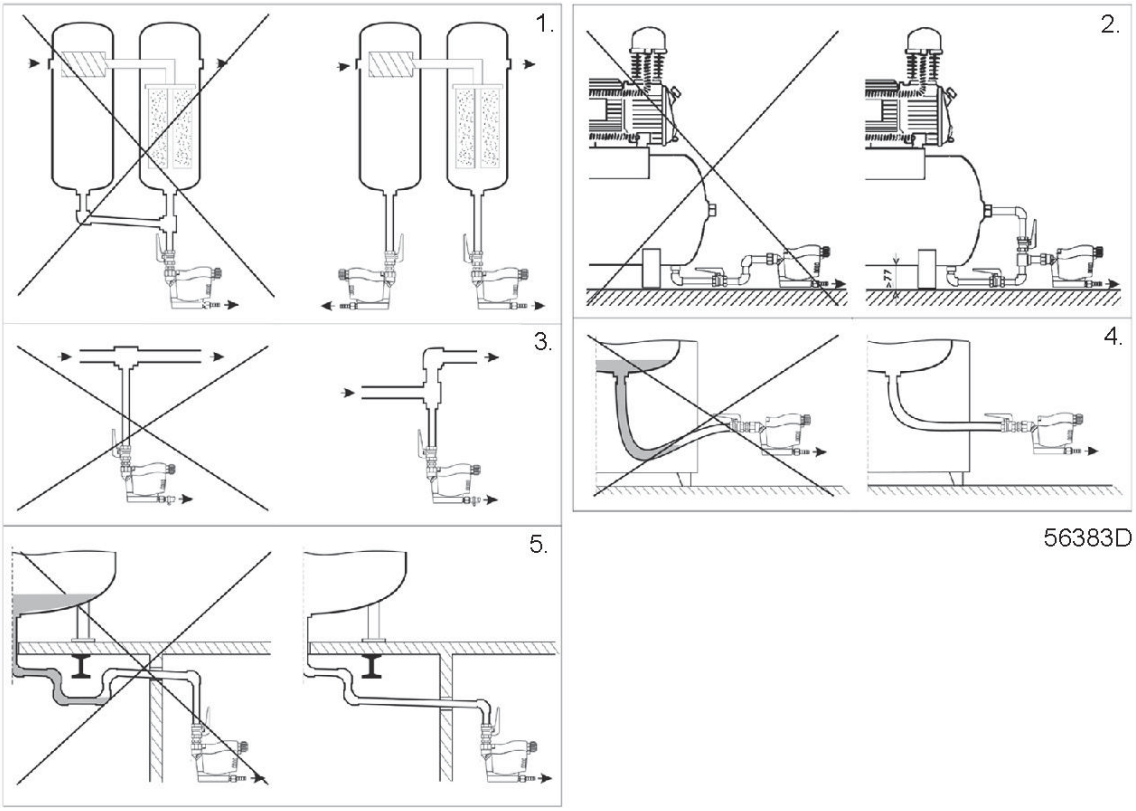


EWD 16K C	230 V	(50 - 60 Hz)
EWD 16K C	110 V	(50 - 60 Hz)
EWD 16K C	24 V	(50 - 60 Hz)
EWD 16K C	110 V NPT	(50 - 60 Hz)

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56392D

3.3 Restrictions

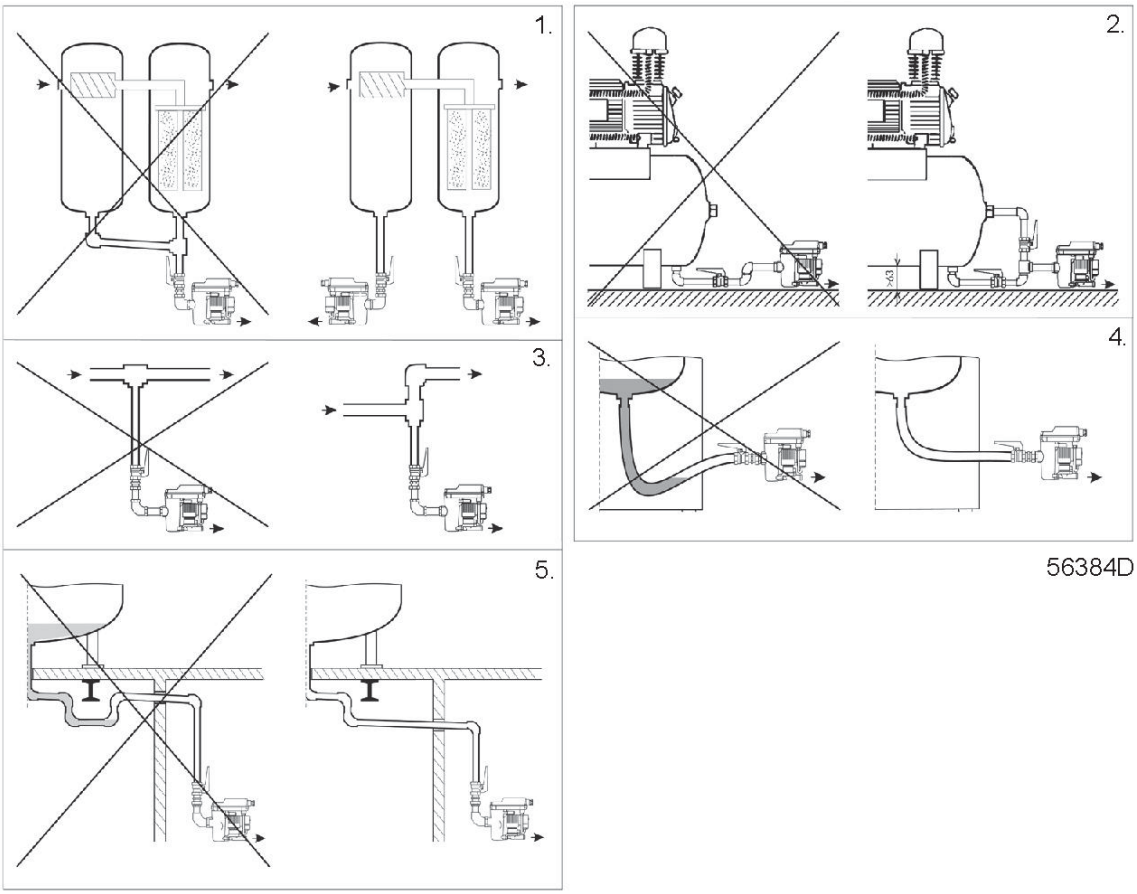
EWD 50 and EWD 75



EWD 50

Note

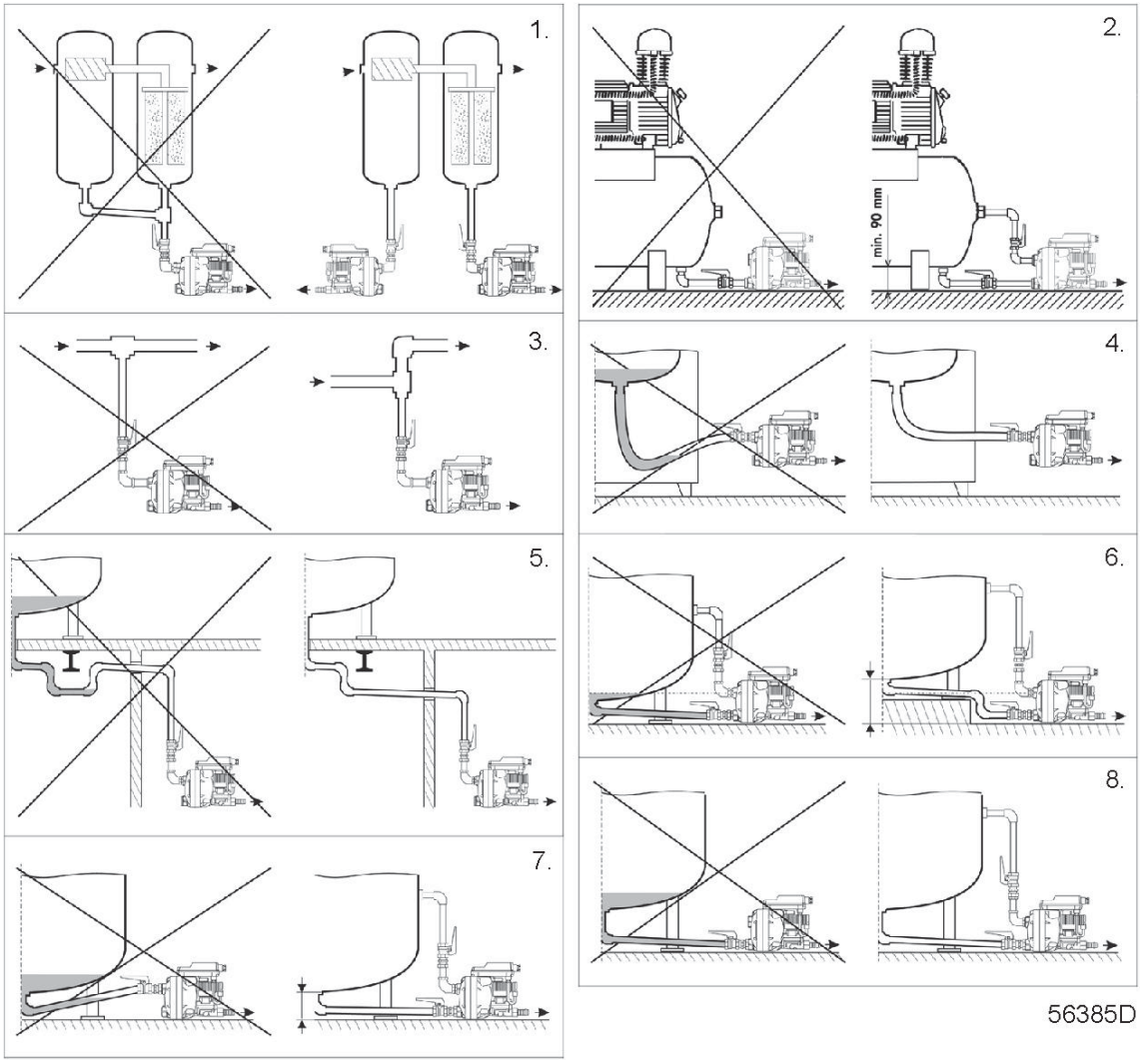
	Only use the EWD 50 B and EWD 50 L for installations and applications proposed and delivered by Atlas Copco.



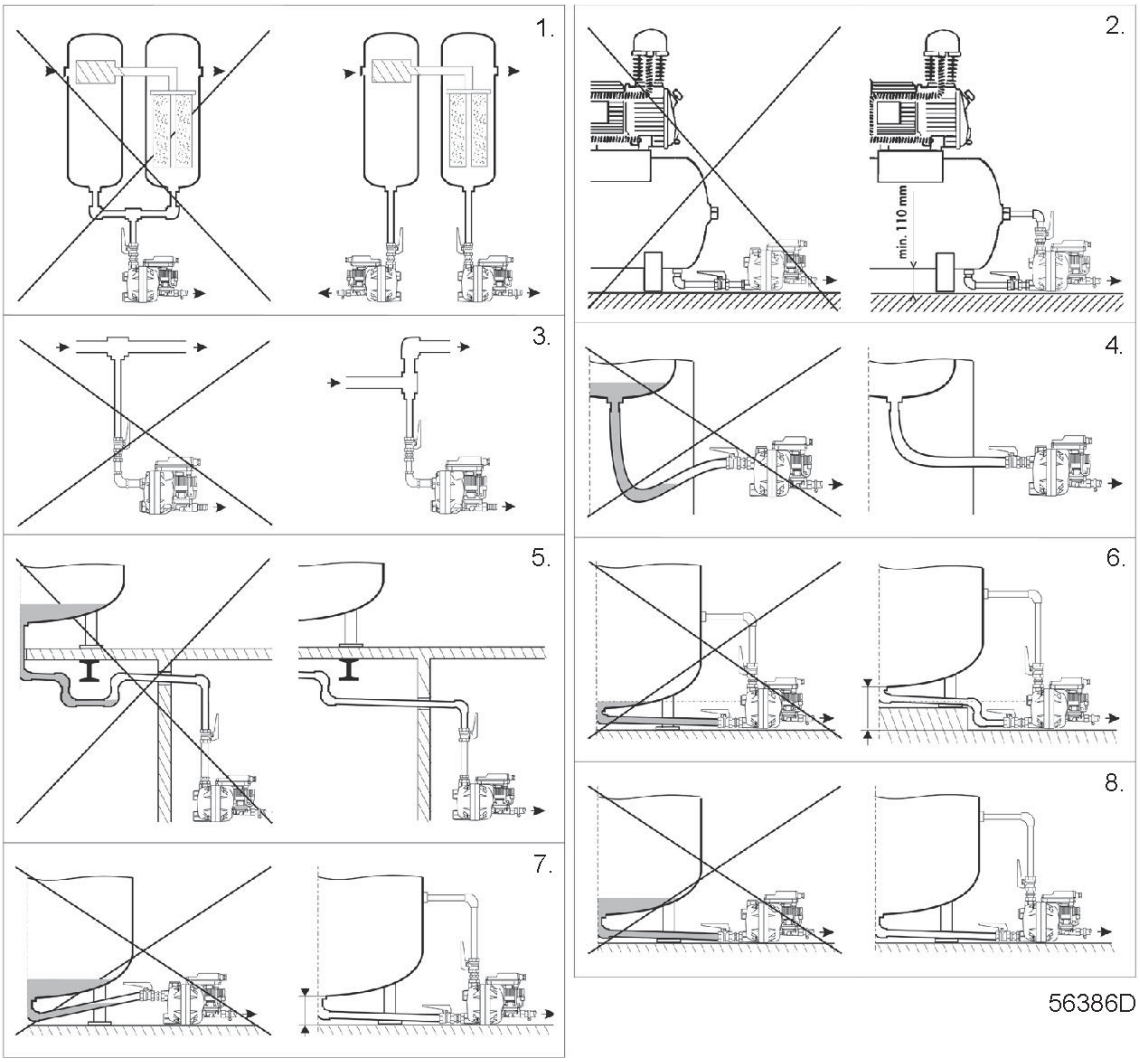
EWD 75

Reference	Description
1	**Pressure differences:** Each condensate source must be drained separately.
2	**Venting:** If the feed line cannot be installed with sufficient slope or if there are other inflow problems, it will be necessary to install a venting line.
3	**Deflector area:** If drainage is to take place directly from a line, it is advisable to arrange the piping so that the air flow is diverted.
4	**Continuous slope / water pockets:** It is important to avoid water pockets when using a pressure hose as a feed line.
5	**Continuous slope / water pockets:** Water pockets must be avoided when installing a feed pipe.

EWD 330 and EWD 1500



EWD 330

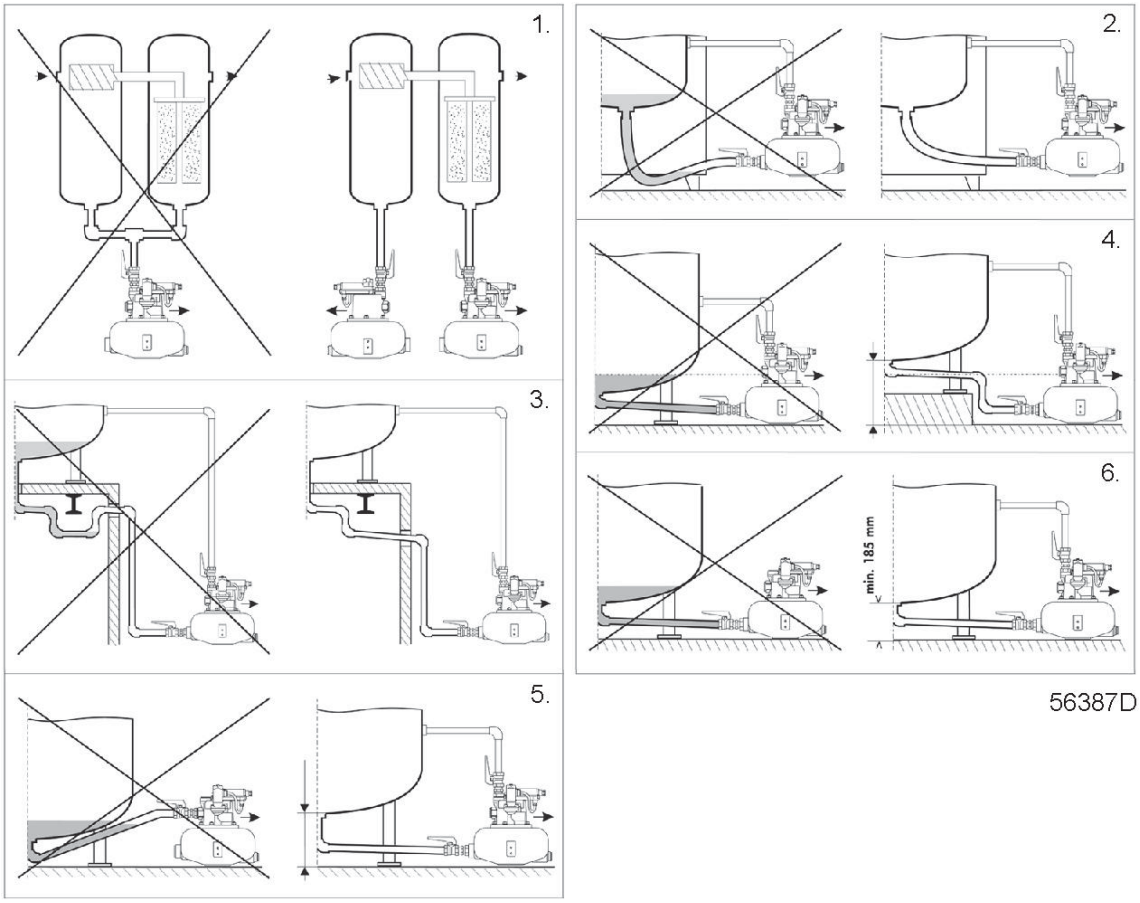


EWD 1500

Reference	Description
1	**Pressure differences:** Each condensate source must be drained separately.
2	**Venting:** If the feed line cannot be installed with sufficient slope or if there are other inflow problems, it will be necessary to install a separate venting line.
3	**Deflector area:** If drainage is to take place directly from a line, it is advisable to arrange the piping so that the air flow is diverted.
4	**Continuous slope / water pockets:** It is important to avoid water pockets when using a pressure hose as a feed line.
5	**Continuous slope / water pockets:** Water pockets must be avoided when installing a feed pipe.
6	**Minimum height of installation:** The inlet connection must be located lower than the lowest point of the collecting tank or vessel.

Reference	Description
7	**Continuous slope:** If the space for installation is too restricted, the lower feed line must be fitted with a separate venting line.
8	**Venting:** If there are large amounts of condensate, it will always be necessary to install a separate venting line.

EWD 16K



56387D

Reference	Description
1	**Pressure differences:** Each condensate source must be drained separately.
2	**Continuous slope / water pockets:** It is important to avoid water pockets when using a pressure hose as a feed line.
3	**Continuous slope / water pockets:** Water pockets must be avoided when installing a feed pipe.
4	**Minimum height of installation:** The inlet connection must be located lower than the lowest point of the collecting tank or vessel.

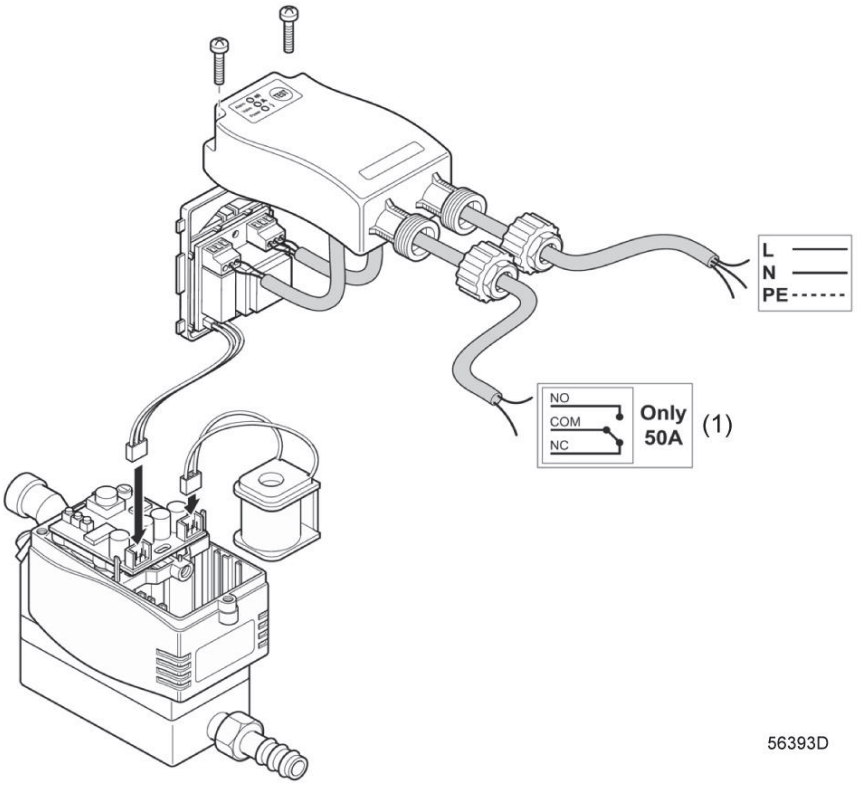
Reference	Description
5	**Continuous slope:** If the space for installation is too restricted, the lower feed line must be fitted with a separate venting line.
6	**Venting:** If there are large amounts of condensate, it will always be necessary to install a separate venting line.

3.4 Electrical connections



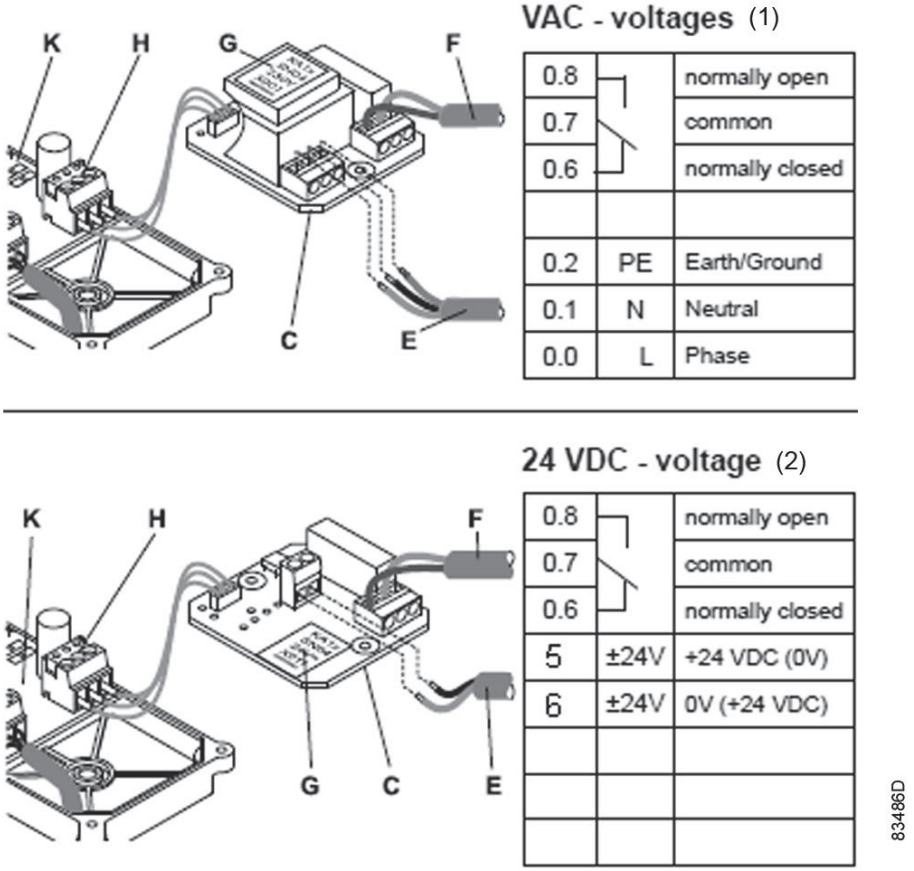
- Risk for electric shock in case of contact with non-insulated parts carrying mains voltage!
 Maintenance work must only be carried out when the device is in a de-energised state!
 Any work involving electrical parts must only be performed by suitably qualified and authorized personnel.
- Protect the internal parts from humidity when the cover is removed for making the connections.
- Apply all relevant instructions in section Safety precautions.
- In case of 24 V DC operation, do not connect the positive wire to the frame because the internal housing potential of the device is negative.
 The supply voltage must meet the requirements for protective extra-low safety voltages (PELV) in accordance with IEC 60364-4-41.
- In case of AC supply, a reliably accessible separator must be provided close-by (e.g. power plug or switch), which separates all current carrying conductors.
- If the potential-free contact carries voltage that is dangerous in the case of contact, a corresponding separator must also be provided
- Between the protective conductor/PE connection and the piping, a potential difference is not admissible. If required, potential equalization in accordance with VDE 0100 / IEC 60364 must be provided for.

EWD 50



(1)	Only on EWD 50 A
L	Phase
N	Neutral
PE	Earthing
COM	Common
NC	Normally closed contact
NO	Normally open contact

EWD 75, EWD 330, EWD 1500 and EWD 16K

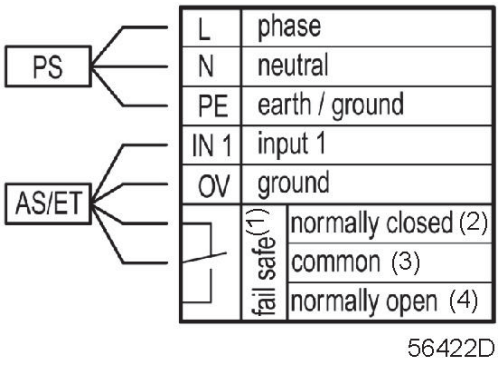


0.0	L	Phase
0.1	N	Neutral
0.2	PE	Earth
0.6	NC	Normally closed contact
0.7	COM	common
0.8	NO	Normally open contact
5	+/- 24 V	+24 V DC (0 V)
6	+/- 24 V	0 V (+24 V DC)
(1)		connections for AC supply voltage
(2)		connections for DC supply voltage

Note:

There is no galvanic isolation between terminals 5 and 6 of the DC devices and the housings or the condensate connections. As regards tests, for example protective conductor tests in accordance with VDE 0701-0702 / IEC 85/361/CD, it must be observed that there is only a connection for the establishment of a functional earthing between the touchable conductive parts of the device and the protective conductor base, and no protective connection capable of carrying current.

In case of external test button



References on drawing

AS	Alarm signal
ET	External test
IN 1	Input 1
L	Phase
N	Neutral
OV	Ground
PE	Earthing
PS	Power supply
(1)	Fail safe
(2)	Normally closed
(3)	Common
(4)	Normally open

4 Maintenance

4.1 Maintenance activities

	• Before starting any maintenance or repairs, close the air outlet valve and press the test button on top of the electronic water drain to depressurise the air system. • Apply all relevant instructions in section Safety precautions.

EWD 50, EWD 75, EWD 330, EWD 1500 and EWD 16K

The set of wearing parts (service kit) must be changed every 8000 hrs or yearly, whichever comes first.

4.2 Service kits

Description

Service kits are available offering the benefit of genuine Atlas Copco parts whilst at the same time keeping the maintenance budget low. The kits comprise all parts needed for servicing. Consult the Parts list for part numbers.

5 Problem solving

5.1 General causes

General

Malfunctioning can for example be caused by:

- Mistakes made during installation
- Pressures below the minimum pressure
- Excessive amount of condensate (overloading)
- Blocked or shut off outlet line
- Excessive amount of dirt particles
- Frozen piping

If the fault is not cleared within the first minute (not for the EWD 50 Std), a fault signal is triggered which can be picked off as a potential-free signal via the alarm relay.

5.2 Faults and remedies

Warnings

⚠	• Before starting any maintenance or repairs, close the air outlet valve and press the test button on top of the electronic water drain to depressurise the air system. • Apply all relevant instructions in section Safety precautions.

Problem solving

Condition	Fault	Remedy
No LED lights up	The power supply is faulty	Check the power supply voltage and compare it to the voltage mentioned on the type plate
	The power supply board is defective	Check the voltage on the power supply board
	The control Printed Circuit Board (PCB) is defective	• Check the 24 VDC voltage (36 VDC without load) on the control PCB • Check the plug connection and the ribbon cable
No condensate is being discharged when the test button is pressed	The feed and/or outlet line is shut off or blocked	Check the feed line and the outlet line
	Wear	Replace the worn parts
	The control Printed Circuit Board (PCB) is defective	Check if the valve opens audibly (Press the test button several times)
	The solenoid valve is defective	Check the 24 VDC voltage (36 VDC without load) on the control PCB

Condition	Fault	Remedy
Condensate is only being discharged when the test button is pressed	The feed line has insufficient slope	Lay the feed line with an adequate slope
	Excessive amount of condensate	Install a venting line
	The sensor tube is extremely dirty	Clean the sensor tube
	The air pressure has dropped below the minimum pressure	Ensure there is the minimum pressure
The electronic drain valve keeps blowing off air	The control air line is blocked	Clean the entire drain valve
	Wear	Replace the worn parts
	The sensor tube is dirty	Clean the sensor tube

6 Optional equipment

6.1 Precautions for optional equipment

Warning

	All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by Atlas Copco.

Precautions

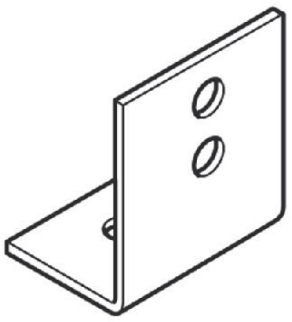
1. Make sure that all electrical wiring has been installed in compliance with the valid regulations.
2. Installation must always be performed by a qualified technician.
3. Installation must be carried out in compliance with the circuit diagrams and connection drawings provided.
4. The electronic drain valve, the feed line and the discharge line must be correctly insulated to prevent freezing and thus serious damage to the device or piping.
5. Do not switch off the heating if there is any likelihood of frost. There may still be condensate left inside the Electronic Water Drain.

Note

	Some precautions are general and may not apply to your optional equipment.

6.2 Fixing bracket

Description



56395D

Bracket to fix the Electronic Water Drain (EWD).

Important note

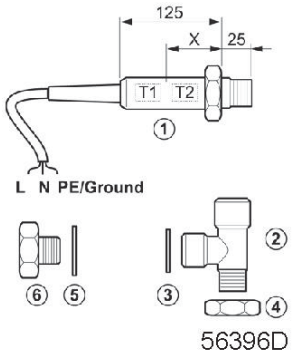
⚠	The fixing bracket is not available as an option for the EWD 50.

Remark

	Consult the relevant Parts list for the correct part number.

6.3 Thermostatically controlled heater

Description



Components

References on drawing

Reference	Name
1	Heating cartridge
2	T-piece
3	Flat gasket (22x27)
4	Nut
5	Flat gasket (26x33)
6	Reducing nipple
L	Phase
N	Neutral
PE/Ground	Earthing
T1	Working thermostat
T2	Safety thermostat
X	Maximum permissible insulation distance

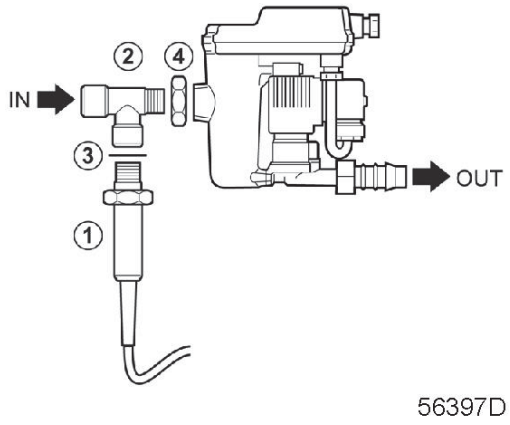
The heater consists of a heating cartridge with built-in thermostats. The working thermostat (T1) registers the ambient temperature, turns the heating on when the temperature drops below 6 ˚C (42.80 ˚F) and turns the heating off when the temperature rises above 15 ˚C (59 ˚F). The safety thermostat (T2) turns off the heating when the temperature rises above 75 ˚C (167 ˚F).

The heater is screwed into the feed line using the adapter that is provided. The metal connection parts make sure that the heat is evenly distributed to the drain valve housing. The operation of the heater is completely independent of the Electronic Water Drain.

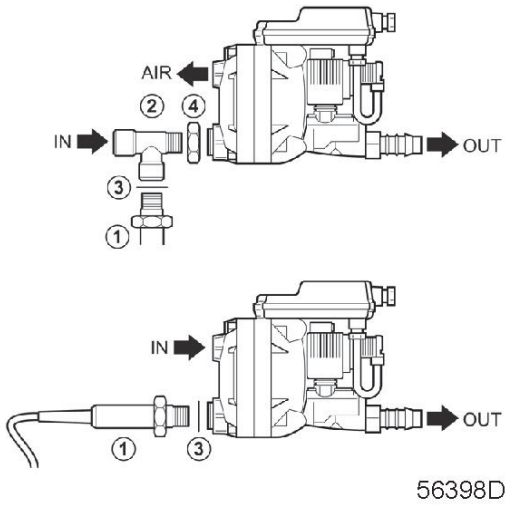
Important note

⚠	The heater is not available as an option for the EWD 50.

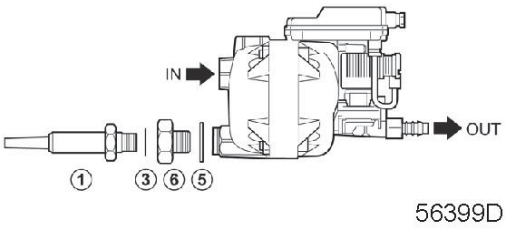
Installation drawing



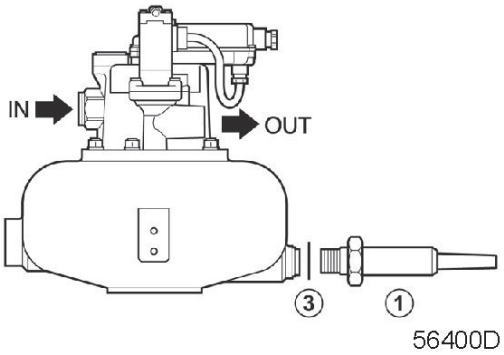
EWD 75



EWD 330



EWD 1500



EWD 16K

Text on drawing

Reference	Name
AIR	Air outlet
IN	Drain valve feed line
OUT	Drain valve discharge line

Important remarks

⚠	**When installing the heater, keep in mind the following points:** • On EWD 75 and EWD 330: when using the T-piece (2), seal the thread to the drain valve with Teflon tape and lock with the nut (4). • The electrical connection must be made correctly via a connection box or via the distribution module when the tracing option (see section Tracing) is also installed. • The working thermostat (T1) may not be covered with thermal insulation since the thermostat has to measure the ambient temperature. The maximum permissible insulation distance (X) is 30 mm (1.17 in). • The fuse protection must be according to the power requirements.

Specifications

Description	Value
Temperature range	Down to -25 ˚C (with correct insulation)
Temperature range	Down to -13 ˚F (with correct insulation)

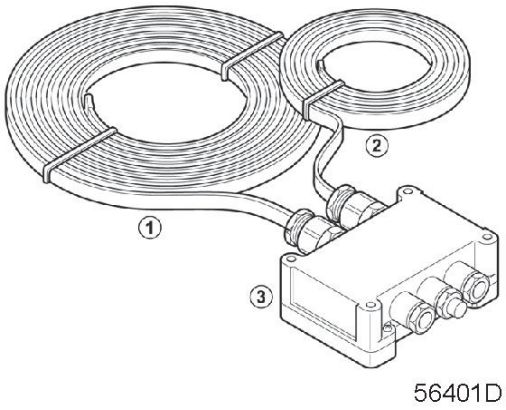
Description	Value
Switching temperature	Switches ON below 6 ˚C Switches OFF above 15 ˚C
Switching temperature	Switches ON below 42.80 ˚F Switches OFF above 59 ˚F
Safety temperature	Switches OFF above 75 ˚C
Safety temperature	Switches OFF above 167 ˚F
Protection standard	IP 65
Weight	0.45 kg
Weight	0.99 lb
Threaded connection	G 1/2 “ (standard) NPT (optional)
Pressure range heating cartridge	Maximum 63 bar
Pressure range heating cartridge	Maximum 913.75 psi
Pressure range adapter set	Maximum 25 bar
Pressure range adapter set	Maximum 362.60 psi
Power supply	Standard: 230 V AC +/- 10 %, 50 Hz - 60 Hz
Power supply	Non-standard: 110 V AC +/- 10 %, 50 Hz - 60 Hz
Power supply	Non-standard: 24 V AC/DC +/- 10 %, 50 Hz - 60 Hz
Power input	24 V version: 50 W
Power input	24 V version: 0.07 hp
Power input	110 V & 230 V version: 125 W
Power input	110 V & 230 V version: 0.17 hp
Length of the cable	2 m
Length of the cable	6.562 ft
Cable cross section	3 x 0.75 mm^2

Remark

	Consult the relevant Parts list for the correct part number.

6.4 Trace heating

Description



Components

References on drawing

Reference	Name
1	Heating tape (3 m (9.843 ft))
2	Heating tape (1 m (3.281 ft))
3	Distribution module, inclusive installation module)

The trace heating consists of a distribution module with two flexible heating tapes which are laid along the piping.

The thermostatic switch inside the distribution module continuously registers the ambient temperature. It switches the heating tape on when the temperature drops below 5 ˚C (41 ˚F) and switches it off when the temperature rises above 15 ˚C (59 ˚F).

The heating tapes are self-regulating, which means that the heat output is adapted to the actual temperature. The tapes can be shortened as desired without affecting the heat output per meter. The distribution module (with integrated ambient temperature sensor) supplies the power for the heating tapes and has a free mains contact.

Important note

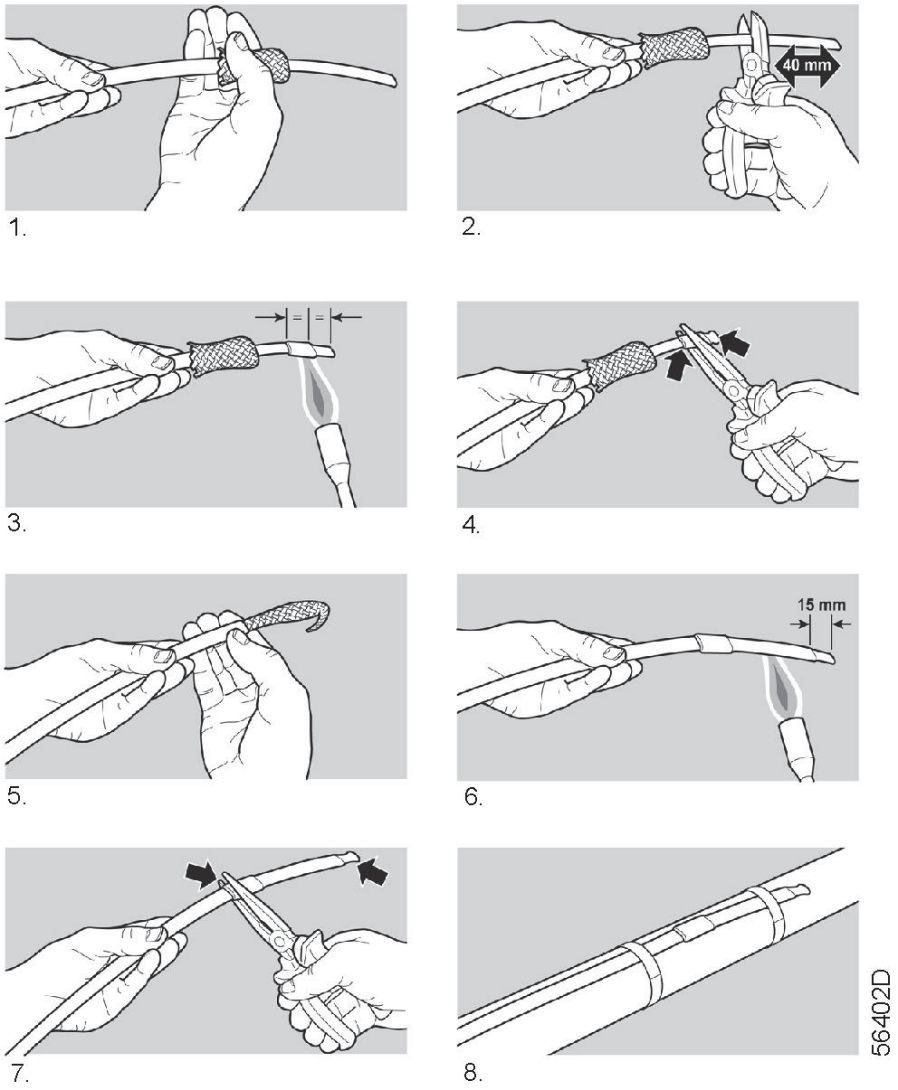
⚠	The distribution box may not be covered with thermal insulation since it houses the thermostatic switch which must register the ambient temperature.

Preparing and installing the heating tapes

In some cases it may be necessary to alter the length of the heating tapes. The instruction below explains how to shorten one of the tapes. The other tape can be altered in the same way.

Important remark

⚠	Make sure not to shorten the tapes too much. They cannot be lengthened.

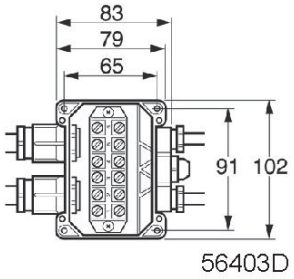


How to shorten the tapes

Step	Action
1	Measure the desired length of the heating tape, cut the rubber protection at that distance and fold the metal shielding backwards.
2	Cut the heating tape at the desired length. The metal shielding must be at least 40 mm (1.56 in) longer than the heating tape.
3	Install the shrinking sleeve on the heating tape as shown.
4	Squeeze the heating tape at the indicated spots.
5	Fold the metal shielding over the end of the heating tape.

Step	Action
6	Install the long shrinking sleeve over the metal shielding. The sleeve must be at least 15 mm (0.59 in) longer than the tape.
7	Squeeze the shrinking sleeve at the indicated spots.
8	Guide the heating tape in a straight line along the piping and fix it by means of cable strips.
9	Insulate the heating tape together with the pipe.

Installing the distribution box

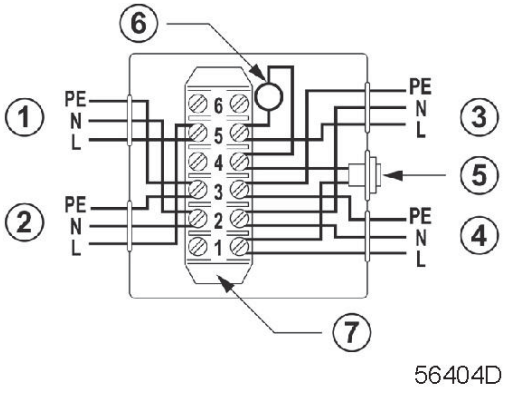


Dimensions of the distribution box

To fix the distribution box to a wall or a panel, holes are provided in the unit. The correct measurements are shown in the drawing.

Connecting the electrical wiring

The tracing option has to be connected as shown.



Connections

References on drawing

Reference	Name
1	Heating tape
2	Heating tape
3	Free mains outlet
4	Mains input

Reference	Name
5	Fuse
6	Thermo-element
7	Terminal strip
L	Phase
N	Neutral
PE	Earthing

Note

	The free mains output is provided for temperature dependent operation. The output allows use of the thermostatic switch for additional heating devices such as the heater.

Specifications

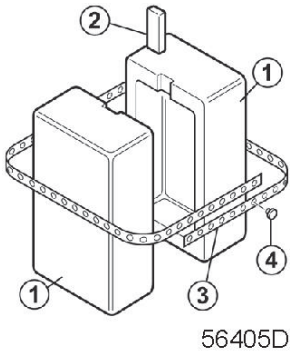
Description	Value
Temperature range	-25 ˚C to 65 ˚C
Temperature range	-13 ˚F to 149 ˚F
Switching temperature	Switches ON below 5 ˚C Switches OFF above 15 ˚C
Switching temperature	Switches ON below 41 ˚F Switches OFF above 59 ˚F
Heating tape length	1 x 1 m (adjustable) 1 x 3 m (adjustable)
Heating tape length	1 x 3.281 ft (adjustable) 1 x 9.843 ft (adjustable)
Weight	0.13 kg/m
Weight	0.09 lb/ft
Protection standard	IP 65
Power supply	Standard: 230 V AC +/- 10 %, 50 Hz - 60 Hz
Power input	P AC <= 10 W/m
Power input	P AC <= 0.003 hp/ft
Fuse	2 A / T / cross-section 5 L20
Cable cross section	3 x 0.75 mm^2

Remark

	Consult the relevant Parts list for the correct part number.

6.5 Insulating shells

Description



Components

References on drawing

Reference	Name
1	Insulating shells (2x)
2	Transparent plug
3	Perforated clamping strap
4	Push-in fastener

The insulating shells (1) protect the entire Electronic Water Drain against heat loss. The LED display and the test button remain free and accessible through a transparent covering (2).

Note

⚠	The insulating shells are not available as an option for EWD 50 and EWD 16K.

Installation

To install the insulating shells (1), proceed as follows:

- Carefully open the necessary holes for the feed line, the discharge line and the heating. The holes are prepunched in the shields.
- Put a shell on each side of the Electronic Water Drain.
- Fix the shells using the clamping strap (3) and the push-in fasteners (4).
- Put the transparent plug (2) in the opening for the LED and the test button.

Remark

👁	Consult the parts list for the correct part number.

7 Technical data

7.1 Reference conditions and limitations

C 1	All condensate drains, except the EWD 50 drain and its variants, have been tested to the requirements of CAN/CSA-C22.2 No. 61010-1, second edition, including Amendment 1, or a later version of the same standard, incorporating the same level of testing requirements.

Reference conditions

EWD 50		Std	A	B	L
Reference ambient temperature	˚C	40	40	40	40
Reference ambient temperature	˚F	104	104	104	104
Reference relative humidity	%	90	90	90	90

EWD 75		Std	C	C EHP
Reference ambient temperature	˚C	40	40	40
Reference ambient temperature	˚F	104	104	104
Reference relative humidity	%	90	90	90

EWD 330		Std, M, ME, E	C, MC, D	C HP	B, BE, MB
Reference ambient temperature	˚C	40	40	40	40
Reference ambient temperature	˚F	104	104	104	104
Reference relative humidity	%	90	90	90	90

EWD 1500		Std	C
Reference ambient temperature	˚C	40	40
Reference ambient temperature	˚F	104	104
Reference relative humidity	%	90	90

EWD 16K		C
Reference ambient temperature	˚C	40
Reference ambient temperature	˚F	104
Reference relative humidity	%	90

Limits

EWD 50		Std	A	B	L
Minimum temperature	˚C	1	1	1	1

EWD 50		Std	A	B	L
Minimum temperature	˚F	33.80	33.80	33.80	33.80
Maximum temperature	˚C	60	60	60	60
Maximum temperature	˚F	140	140	140	140
Maximum working pressure	bar	16	16	16	16
Maximum working pressure	psi	230	230	230	230
Minimum working pressure	bar	0.8	0.8	0.8	0.8
Minimum working pressure	psi	12	12	12	12

EWD 75		Std	C	C EHP
Minimum temperature	˚C	1	1	1
Minimum temperature	˚F	33.80	33.80	33.80
Maximum temperature	˚C	60	60	60
Maximum temperature	˚F	140	140	140
Maximum working pressure	bar	16	16	63
Maximum working pressure	psi	230	230	910
Minimum working pressure	bar	0.8	1.2	1.2
Minimum working pressure	psi	12	17	17

EWD 330		Std, M, ME, E	C, MC, D	C HP	B, BE, MB
Minimum temperature	˚C	1	1	1	1
Minimum temperature	˚F	33.80	33.80	33.80	33.80
Maximum temperature	˚C	60	60	60	60
Maximum temperature	˚F	140	140	140	140
Maximum working pressure	bar	16	16	25	16
Maximum working pressure	psi	230	230	360	230
Minimum working pressure	bar	0.8	1.2	1.2	1.2
Minimum working pressure	psi	12	17	17	17

EWD 1500		Std	C
Minimum temperature	˚C	1	1
Minimum temperature	˚F	33.80	33.80
Maximum temperature	˚C	60	60
Maximum temperature	˚F	140	140
Maximum working pressure	bar	16	16
Maximum working pressure	psi	230	230
Minimum working pressure	bar	0.8	1.2
Minimum working pressure	psi	12	17

EWD 16K		C
Minimum temperature	˚C	1

EWD 16K		C
Minimum temperature	˚F	33.80
Maximum temperature	˚C	60
Maximum temperature	˚F	140
Maximum working pressure	bar	16
Maximum working pressure	psi	230
Minimum working pressure	bar	1.2
Minimum working pressure	psi	17

7.2 Electronic water drain data



All data specified below apply under reference conditions.
For operation at an ambient temperature of 35 ˚C (95 ˚F) and 70 % relative humidity, multiply the capacity by 1.3.
For operation at an ambient temperature of 35 ˚C (95 ˚F) and 100 % relative humidity, multiply the capacity by 0.77.

EWD 50		Std	A	B	L
Maximum compressor capacity when used as compressor drain	l/s	50	50	500	500
Maximum compressor capacity when used as compressor drain	cfm	106	106	1060	1060
Maximum dryer capacity when used as dryer drain if the compressor has no separate drain	l/s	33	33	430	430
Maximum dryer capacity when used as dryer drain if the compressor has no separate drain	cfm	70	70	910	910
Maximum dryer capacity when used as dryer drain if the compressor has separate drain	l/s	100	100	1330	1330
Maximum dryer capacity when used as dryer drain if the compressor has separate drain	cfm	210	210	2800	2800
Maximum filter capacity when used as filter drain (after dryer)	l/s	500	500	6650	6650
Maximum filter capacity when used as filter drain (after dryer)	cfm	1060	1060	14000	14000
Weight	kg	0.7	0.7	0.7	0.7
Weight	lb	1.54	1.54	1.54	1.54
Type of condensate (see table 1)		a + b	a + b	b	a + b
Collector material (see table 1)		e	e	e	e
Condensate inlet	G-NPT	1/2 “	1/2 “	1/2 “	1/2 “
Condensate outlet	G-NPT	1/4 “	1/4 “	1/4 “	1/4 “
Condensate outlet hose	mm	10-8	10-8	10-8	10-8

EWD 50		Std	A	B	L
Condensate outlet hose	in	0.39-0.31	0.39-0.31	0.39-0.31	0.39-0.31
Feed line diameter (slope ≥ 1 %)		1/2 "	1/2 "	1/2 "	1/2 "
Collecting line (slope ≥ 1 %)		1/2 "	1/2 "	1/2 "	1/2 "
Maximum rise of outlet line	m	5	5	5	5
Maximum rise of outlet line	ft	16.4	16.4	16.4	16.4
Venting line on valve possible		No	No	No	No
Supply voltage	V	See data plate, +/- 10 %			
Frequency	Hz	50 - 60	50 - 60	50 - 60	50 - 60
IP code		IP 65	IP 65	IP 65	IP 65
Maximum power consumption	VA	< 3.0	< 3.0	< 3.0	< 3.0
Cable diameter	mm	5.8 - 8.5	5.8 - 8.5	5.8 - 8.5	5.8 - 8.5
Cable section	mm²	3 x 0.75-1.5	3 x 0.75-1.5	3 x 0.75-1.5	3 x 0.75-1.5
Cable diameter	in	0.23 - 0.33	0.23 - 0.33	0.23 - 0.33	0.23 - 0.33
Cable size		3 x AWG18-14	3 x AWG18-14	3 x AWG18-14	3 x AWG18-14
Fuse	A	1 A slow (recommended for AC, stipulated for DC)			
No voltage or alarm		--	Contact 0.7 - 0.6 closed (relay not energized)		
Normal operation (no alarm)		--	Contact 0.7 - 0.8 closed (relay energized)		
Contact rating		--	< 250 V AC / < 0.5 A > 12 V DC / > 50 mA		

EWD 75		Std	C	C EHP
Maximum compressor capacity when used as compressor drain	l/s	75	75	75
Maximum compressor capacity when used as compressor drain	cfm	160	160	160
Maximum dryer capacity when used as dryer drain if the compressor has no separate drain	l/s	50	50	50
Maximum dryer capacity when used as dryer drain if the compressor has no separate drain	cfm	106	106	106
Maximum dryer capacity when used as dryer drain if the compressor has separate drain	l/s	150	150	150
Maximum dryer capacity when used as dryer drain if the compressor has separate drain	cfm	320	320	320
Maximum filter capacity when used as filter drain (after dryer)	l/s	750	750	750
Maximum filter capacity when used as filter drain (after dryer)	cfm	1590	1590	1590
Weight	kg	0.8	0.8	0.8
Weight	lb	1.76	1.76	1.76
Type of condensate (see table 1)		a	a + b	a + b
Collector material (see table 1)		c	d	d
Condensate inlet	G-NPT	1/2 “	1/2 “	1/2 “
Condensate outlet	G-NPT	3/8 “	3/8 “	3/8 “
Condensate outlet (hose)	mm	13-10	13-10	--

EWD 75		Std	C	C EHP
Condensate outlet (hose)	in	0.51-0.39	0.51-0.39	--
Supply voltage	V	See data plate, +/- 10 %		
Frequency	Hz	50 - 60	50 - 60	50 - 60
Isolation class		IP 65	IP 65	IP 65
Maximum power consumption	VA	< 8.0	< 8.0	< 8.0
Cable diameter	mm	5.8 - 8.5	5.8 - 8.5	5.8 - 8.5
Cable section	mm²	3 x 0.75-1.5	3 x 0.75-1.5	3 x 0.75-1.5
Cable diameter	in	0.23 - 0.33	0.23 - 0.33	0.23 - 0.33
Cable size		3 x AWG18-14	3 x AWG18-14	3 x AWG18-14
Fuse	A	1 A slow (recommended for AC, stipulated for DC)		
No voltage or alarm		Contact 0.7 - 0.6 closed (relay not energized)		
Normal operation (no alarm)		Contact 0.7 - 0.8 closed (relay energized)		
Connection data of the potential-free contact Switch to load *		AC: max. 250 V / 1 A DC: max. 30 V / 1 A		
Connection data of the potential-free contact Switch to low signal *		min. 5 V DC / 10 mA		
Feed line diameter (slope ≥ 1 %)		1/2 “	1/2 “	1/2 “
Collecting line (slope ≥ 1 %)		1/2 “	1/2 “	1/2 “
Maximum rise of outlet line	m	5	5	5
Maximum rise of outlet line	ft	16.4	16.4	16.4
Venting line on valve possible		No	No	No

(1): The switching of loads means that the properties of the contact are no longer suitable for the switching of low signals.

EWD 330		Std, M, ME, E	C, MC, D	C HP	B, BE, MB
Maximum compressor capacity when used as compressor drain	l/s	330	330	330	330
Maximum compressor capacity when used as compressor drain	cfm	699	699	699	699
Maximum dryer capacity when used as dryer drain if the compressor has no separate drain	l/s	220	220	220	220
Maximum dryer capacity when used as dryer drain if the compressor has no separate drain	cfm	466	466	466	466
Maximum dryer capacity when used as dryer drain if the compressor has separate drain	l/s	660	660	660	660
Maximum dryer capacity when used as dryer drain if the compressor has separate drain	cfm	1398	1398	1398	1398
Maximum filter capacity when used as filter drain (after dryer)	l/s	3300	3300	3300	3300

EWD 330		Std, M, ME, E	C, MC, D	C HP	B, BE, MB
Maximum filter capacity when used as filter drain (after dryer)	cfm	6992	6992	6992	6992
Weight	kg	2	2	2.9	2
Weight	lb	4.41	4.41	6.39	4.41
Type of condensate		a	a+b	a+b	a+b
Collector material		c	d	d	d
Condensate inlet	G-NPT	2 x 1/2 “	2 x 1/2 “	2 x 1/2 “	2 x 1/2 “
Condensate outlet	G-NPT	1/2 “	1/2 “	3/8 “	1/2 “
Condensate outlet (hose)	mm	13-10	13-10	--	13-10
Condensate outlet (hose)	in	0.51-0.39	0.51-0.39	--	0.51-0.39
Supply voltage	V	See data plate, +/- 10 %			
Frequency	Hz	50 - 60	50 - 60	50 - 60	50 - 60
Isolation class		IP 65	IP 65	IP 65	IP 65
Maximum power consumption	VA	< 8.0	< 8.0	< 8.0	< 8.0
Cable diameter	mm	5.8 - 8.5	5.8 - 8.5	5.8 - 8.5	5.8 - 8.5
Cable section	mm²	3 x 0.75-1.5	3 x 0.75-1.5	3 x 0.75-1.5	3 x 0.75-1.5
Cable diameter	in	0.23 - 0.33	0.23 - 0.33	0.23 - 0.33	0.23 - 0.33
Cable size		3 x AWG18-14	3 x AWG18-14	3 x AWG18-14	3 x AWG18-14
Fuse	A	1 A slow (recommended for AC, stipulated for DC)			
No voltage or alarm		Contact 0.7 - 0.6 closed (relay not energized)			
Normal operation (no alarm)		Contact 0.7 - 0.8 closed (relay energized)			
Connection data of the potential-free contact Switch to load (1)		AC: max. 250 V / 1 A DC: max. 30 V / 1 A			
Connection data of the potential-free contact Switch to low signal (1)		min. 5 V DC / 10 mA			
Feed line diameter (slope ≥ 1 %)		1/2 “	1/2 “	1/2 “	1/2 “
Collecting line (slope ≥ 1 %)		3/4 “	3/4 “	3/4 “	3/4 “
Maximum rise of outlet line	m	5	5	5	5
Maximum rise of outlet line	ft	16.4	16.4	16.4	16.4
Venting line on valve possible		Yes	Yes	Yes	Yes

(1): The switching of loads means that the properties of the contact are no longer suitable for the switching of low signals.

EWD 1500		Std	C
Maximum compressor capacity when used as compressor drain	l/s	1500	1500
Maximum compressor capacity when used as compressor drain	cfm	3178	3178
Maximum dryer capacity when used as dryer drain if the compressor has no separate drain	l/s	1000	1000
Maximum dryer capacity when used as dryer drain if the compressor has no separate drain	cfm	2118	2118

EWD 1500		Std	C
Maximum dryer capacity when used as dryer drain if the compressor has separate drain	l/s	3000	3000
Maximum dryer capacity when used as dryer drain if the compressor has separate drain	cfm	6357	6357
Maximum filter capacity when used as filter drain (after dryer)	l/s	15000	15000
Maximum filter capacity when used as filter drain (after dryer)	cfm	31783	31783
Weight	kg	2.9	2.9
Weight	lb	6.39	6.39
Type of condensate		a	a+b
Collector material		c	d
Condensate inlet	G-NPT	3 x 3/4 “	3 x 3/4 “
Condensate outlet	G-NPT	1/2 “	1/2 “
Condensate outlet (hose)	mm	13-10	13-10
Condensate outlet (hose)	in	0.51-0.39	0.51-0.39
Supply voltage	V	See data plate, +/- 10 %	
Frequency	Hz	50 - 60	50 - 60
Isolation class		IP 65	IP 65
Maximum power consumption	VA	< 8.0	< 8.0
Cable diameter	mm	5.8 - 8.5	5.8 - 8.5
Cable section	mm²	3 x 0.75-1.5	3 x 0.75-1.5
Cable diameter	in	0.23 - 0.33	0.23 - 0.33
Cable size		3 x AWG18-14	3 x AWG18-14
Fuse	A	1 A slow (recommended for AC, stipulated for DC)	
No voltage or alarm		Contact 0.7 - 0.6 closed (relay not energized)	
Normal operation (no alarm)		Contact 0.7 - 0.8 closed (relay energized)	
Connection data of the potential-free contact Switch to load (1)		AC: max. 250 V / 1 A DC: max. 30 V / 1 A	
Connection data of the potential-free contact Switch to low signal (1)		min. 5 V DC / 10 mA	
Feed line diameter (slope ≥ 1 %)		3/4 “	3/4 “
Collecting line (slope ≥ 1 %)		1 “	1 “
Maximum rise of outlet line	m	5	5
Maximum rise of outlet line	ft	16.4	16.4
Venting line on valve possible		Yes	Yes

(1): The switching of loads means that the properties of the contact are no longer suitable for the switching of low signals.

EWD 16K		C
Maximum compressor capacity when used as compressor drain	l/s	16660
Maximum compressor capacity when used as compressor drain	cfm	35300

EWD 16K		C
Maximum dryer capacity when used as dryer drain if the compressor has no separate drain	l/s	11100
Maximum dryer capacity when used as dryer drain if the compressor has no separate drain	cfm	23520
Maximum dryer capacity when used as dryer drain if the compressor has separate drain	l/s	33320
Maximum dryer capacity when used as dryer drain if the compressor has separate drain	cfm	70601
Maximum filter capacity when used as filter drain (after dryer)	l/s	--
Maximum filter capacity when used as filter drain (after dryer)	cfm	--
Weight	kg	5.9
Weight	lb	13.01
Type of condensate		a+b
Collector material		d
Condensate inlet	G-NPT	2 x 3/4 “ + 1 “
Condensate outlet	G-NPT	1/2 “
Condensate outlet (hose)	mm	--
Condensate outlet (hose)	in	--
Supply voltage	V	See data plate, +/- 10 %
Frequency	Hz	50 - 60
Isolation class		IP 65
Maximum power consumption	VA	< 8.0
Cable diameter	mm	5.8 - 8.5
Cable section	mm²	3 x 0.75-1.5
Cable diameter	in	0.23 - 0.33
Cable size		3 x AWG18-14
Fuse	A	1 A slow (recommended for AC, stipulated for DC)
No voltage or alarm		Contact 0.7 - 0.6 closed (relay not energized)
Normal operation (no alarm)		Contact 0.7 - 0.8 closed (relay energized)
Connection data of the potential-free contact Switch to load (1)		AC: max. 250 V / 1 A DC: max. 30 V / 1 A
Connection data of the potential-free contact Switch to low signal (1)		min. 5 V DC / 10 mA
Feed line diameter (slope ≥ 1 %)		3/4 “ - 1 “
Collecting line (slope ≥ 1 %)		1 “
Maximum rise of outlet line	m	5
Maximum rise of outlet line	ft	16.4
Venting line on valve possible		Yes (always install a venting line)

(1): The switching of loads means that the properties of the contact are no longer suitable for the switching of low signals.

Table 1

a	Suitable for oil contaminated condensate
b	For oil free condensate
c	Aluminium
d	Aluminium, hard coated
e	Plastic, reinforced glass fiber

	For explanation of type versions, see section Functional description.

8 Pressure equipment directives

Components subject to 97/23/EC Pressure Equipment Directive

Only the EWD16K range is subject to 97/23/EC Pressure Equipment Directive.

Overall rating

The EWD 16K conforms to PED category I. All other devices have no category.

9 Declaration of conformity

EC DECLARATION OF CONFORMITY

We, (1), hereby declare that the following products and their variants comply with the following directives and technical standards. This declaration is valid only for products in the original condition (as manufactured). Modifications or parts added not by the manufacturer are excluded from this decalaration.

Product designation	Condensate drain
Model range	EWD 50, EWD 75, EWD 330, EWD 1500, EWD 16K and their variants
Voltage versions	24 V DC, 24 V AC, 48 V AC, 115 V AC, 230 V AC
Low voltage directive 2006/95/EC	
Harmonised standards applied	EN 61010-1:2001 + corrigendum 1:2002
Year of CE labeling	99
The devices with operating voltage of 24 V DC, 24 V AC and 48 V AC are not in the scope of the Low Voltage Directive.	
EMC Directive 2004/108/EC	
Harmonised standards applied	EN 55011:2007 + A2:2007, Group 1, class B; EN 61326-1:2006
Pressure Equipment Directive PED 97/23/EC (only EWD 16K C)	
Classification or pressure equipment in accordance with PED, Article 9.	Pressure equipment for fluid group 2
Conformity assessment procedure in accordance with PED, Article 10.	Module A, Category I

(1): Contact address:

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Condensate management



OSC 35, OSC 95, OSC 145, OSC 355, OSC 600, OSC 825, OSC 1200, OSC 2400

Instruction book

Atlas Copco

Condensate management

OSC 35, OSC 95, OSC 145, OSC 355, OSC 600, OSC 825, OSC 1200, OSC 2400

Instruction book

Original instructions

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This applies in particular to trademarks, model denominations, part numbers and drawings.

This instruction book is valid for CE as well as non-CE labelled machines. It meets the requirements for instructions specified by the applicable European directives as identified in the Declaration of Conformity.

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1 Safety precautions

1.1 Safety icons

Explanation

	Danger for life
	Warning
	Important note

1.2 Safety precautions during installation

	All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

General precautions

1. The operator must employ safe working practices and observe all related local work safety requirements and regulations.
2. If any of the following statements does not comply with local legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorised, trained, specialised personnel.
4. Before carrying out any maintenance, repair work, adjustment or any other non-routine checks, stop the device. In addition, the power isolating switch must be opened and locked.

Precautions during installation

1. Place the device where the ambient air is as cool and clean as possible.
2. During installation or any other intervention on one of the connected machines, the machine must be stopped, de-energized and the isolating switch opened and locked before any maintenance or repair. As a further safeguard, persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the start equipment.
3. The electrical connections must correspond to the local codes. The device must be earthed and protected against short circuits by fuses in all phases. A lockable power isolating switch must be installed near the device.
4. For machines controlled by a central control system, a sign stating "This machine may start without warning" must be affixed near the instrument panel.
5. In multiple compressor systems, manual valves must be installed to isolate each compressor. Non-return valves (check valves) must not be relied upon for isolating pressure systems.

6. Never remove or tamper with the safety devices.

	Also consult following safety precautions: Safety precautions during operation and Safety precautions during maintenance or repair. These precautions apply to electrical devices. For precautions applying to the connected equipment consult the relevant instruction book. Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your device.

1.3 Safety precautions during operation

	All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

General precautions

1. The operator must employ safe working practices and observe all related local work safety requirements and regulations.
2. If any of the following statements does not comply with local legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorised, trained, specialised personnel.
4. Before carrying out any maintenance, repair work, adjustment or any other non-routine checks, stop the device. In addition, the power isolating switch must be opened and locked.

Precautions during operation

1. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
2. Never operate the device in the presence of flammable or toxic fumes, vapours or particles.
3. Never operate the machine below or in excess of its limit ratings.
4. Keep all bodywork doors and panels closed during operation. The doors may be opened for short periods only, e.g. to carry out routine checks. Wear ear protectors when opening a door if applicable.
5. People staying in environments or rooms where the sound pressure level reaches or exceeds 90 dB(A) shall wear ear protectors.
6. Periodically check that:
 - All guards and fasteners are in place and tight
 - All hoses and/or pipes are in good condition, secure and not rubbing
 - There are no leaks
 - All electrical leads are secure and in good order
7. Never remove or tamper with the safety devices.



Also consult following safety precautions: Safety precautions during installation and Safety precautions during maintenance or repair.
These precautions apply to electrical devices.
For precautions applying to the connected equipment consult the relevant instruction book.
Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.4 Safety precautions during maintenance or repair



All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

General precautions

1. The operator must employ safe working practices and observe all related local work safety requirements and regulations.
2. If any of the following statements does not comply with local legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorised, trained, specialised personnel.
4. Before carrying out any maintenance, repair work, adjustment or any other non-routine checks, stop the device. In addition, the power isolating switch must be opened and locked.

Precautions during maintenance or repair

1. Use only the correct tools for maintenance and repair work.
2. Use only genuine spare parts.
3. A warning sign bearing a legend such as "work in progress; do not start" shall be attached to the starting equipment, including all remote start equipment.
4. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
5. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapours of cleaning liquids.
6. Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.
7. Never use a light source with open flame for inspecting the interior of the device.
8. All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action.
9. Before clearing the device for use after maintenance or repair, check that operating pressures, temperatures and time settings are correct. Check that all control and shut-down devices are fitted and that they function correctly.
10. Never use caustic solvents which can damage materials of the air net.

	Also consult following safety precautions: Safety precautions during installation and Safety precautions during operation. These precautions apply to electrical devices. For precautions applying to the connected equipment consult the relevant instruction book. Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

	Units and/or used parts should be disposed of in an environmentally friendly and safe manner and in line with the local recommendations and legislation.

2 General description

2.1 Introduction

Compressed air produced by oil-injected compressors contains a small quantity of oil. During the cooling of the air in the aftercooler and in the refrigeration dryer (on compressors with built-in refrigeration dryer), oil-containing condensate is formed.

OSC are condensate treatment devices, designed to separate the major part of this oil from the condensate and absorb it in filters.

They are insensitive to shocks and vibration because of the use of filters and can be used with all types of drains. The condensate meets the requirements of the environmental codes.

The number in the model designation is the air capacity of the compressor in litres per second (see section Technical data).

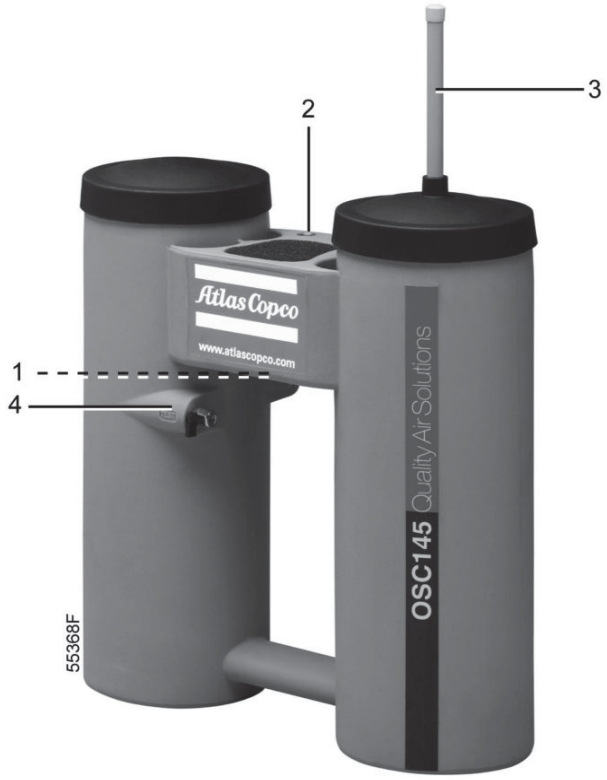
OSC 35 up to OSC 145 have two towers and are called two-step units.

OSC 355 up to OSC 1200 have three towers and are called three-step units.

OSC 2400 have six towers. They consist of two three-step units.

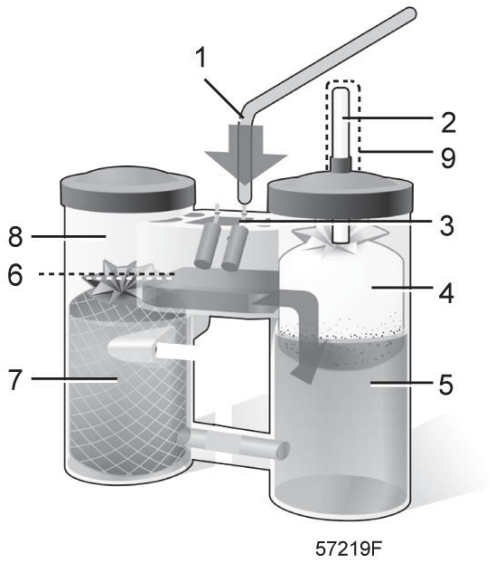
2.2 Operation

OSC 35 up to OSC 145:



OSC 145

1	Condensate outlet (at rear side)
2	Condensate inlet
3	Service indicator
4	Test outlet



Flow diagram (OSC 35 up to OSC 145)

1	Condensate inlet
2	Service indicator (oleophilic filter)
3	Mufflers
4	Oleophilic filter
5	First tower
6	Condensate outlet
7	Activated carbon filter
8	Second tower
9	Protector

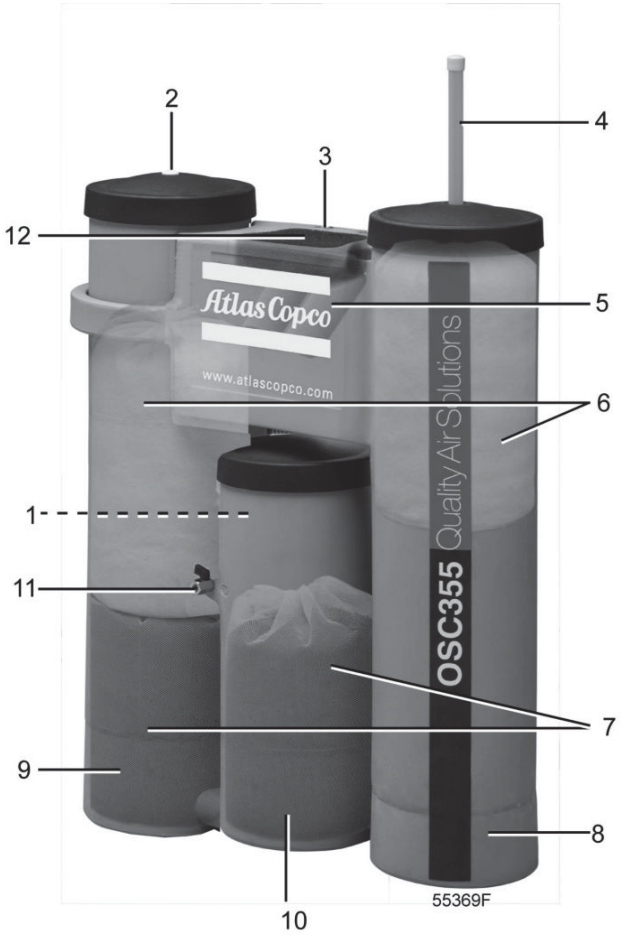
The condensate, containing fine oil droplets, enters the unit via mufflers (3) and is depressurised. The condensate flows to the first tower and seeps through an oleophilic filter (4), which absorbs most of the oil.

The water from the first tower, still containing a small quantity of oil, gradually flows to a second tower (8), where an activated carbon filter (7) is fitted. This filter absorbs almost all of the remaining oil.

The clean condensate is drained to the condensate outlet (.

The oleophilic filter floats on the water. The more oil the filter absorbs, the deeper it will sink, and service indicator (2) will move downwards with the filter. The filter must be replaced when the service indicator is down.

OSC 355 up to OSC 2400:



OSC 355

1	Condensate outlet (at rear side)
2	Service indicator (unit clogged)
3	Condensate inlet
4	Service indicator (oleophilic filter)
5	Mufflers
6	Oleophilic filters
7	Activated carbon filters
8	First tower
9	Second tower
10	Third tower
11	Test outlet
12	Diffuser

The condensate, containing fine oil droplets, enters the unit via mufflers (5) and is depressurised. The condensate flows to the first tower and seeps through an oleophilic filter, which absorbs most of the oil.

The water from the first tower, still containing a small quantity of oil, gradually flows to a second tower (9), where two filters are fitted: a small oleophilic filter, which absorbs some more oil from the condensate, and an activated carbon filter (7). The activated carbon filter starts to absorb the remaining oil in the condensate. The condensate gradually flows to a third tower (10), where another activated carbon filter is fitted, which absorbs almost all of the remaining oil.

The clean condensate is drained to the condensate outlet (1).

The oleophilic filter floats on the water. The more oil the filter absorbs, the deeper it will sink, and service indicator (2) will move downwards with the filter. The filter must be replaced when the service indicator is down.

3 Installation

3.1 Dimension drawing

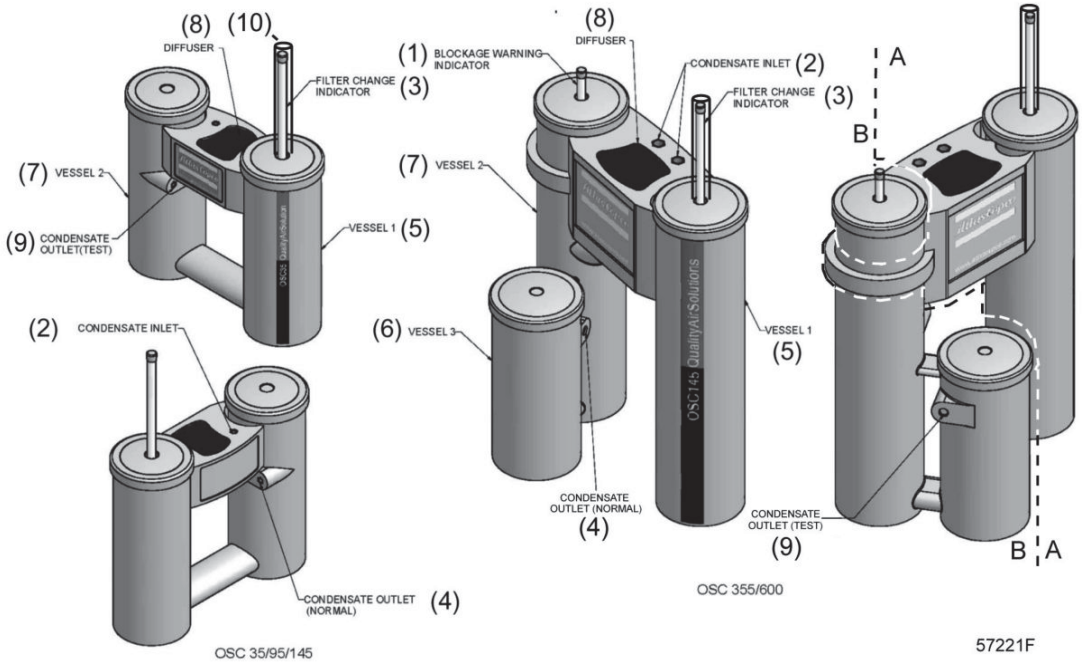


	OSC 35	OSC 95	OSC 145	OSC 355	OSC 600	OSC 825	OSC 1200	OSC 2400
A (mm)	470	680	680	750	750	945	945	945
A (inch)	18.5	26.7	26.7	29.5	29.5	37.2	37.2	37.2
B (mm)	165	255	255	546	546	650	695	1185
B (inch)	6.4	10	10	21.4	21.4	25.5	27.3	46.6
C (mm)	745	940	940	1100	1330	1450	1450	1450
C (inch)	29.3	37	37	43.3	52.3	57	57	57
Shipping weight (kg)	4	13	15	25	26	28	30	60
Shipping weight (lb)	8.8	28.6	33	55.1	57.3	61.7	66.1	132.2
Operating weight (kg)	16	51	53	80	103	151	164	324
Operating weight (lb)	35.2	112.4	116.8	176.3	227	332.8	361.5	714.2

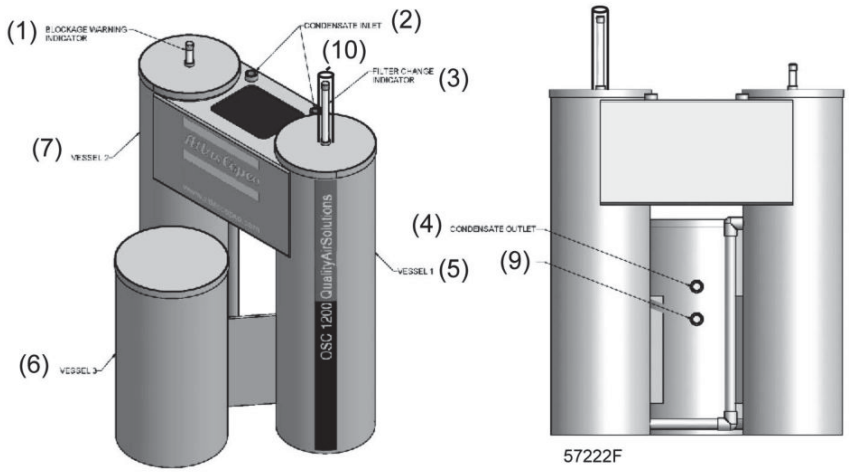
Model	Connections	
	Inlet BSP/NPT	Outlet BSP/NPT
OSC 35	1 x 1/2 "	1 x 1/2 "
OSC 95	2 x 1/2 "	1 x 1/2 "
OSC 145	2 x 1/2 "	1 x 1/2 "
OSC 355	2 x 3/4 "	1 x 3/4 "
OSC 600	2 x 3/4 "	1 x 3/4 "

Model	Connections	
	Inlet BSP/NPT	**Outlet BSP/NPT**
OSC 825	2 x 3/4 "	1 x 3/4 "
OSC 1200	2 x 3/4 "	1 x 3/4 "
OSC 2400	2 x 3/4 "	1 x 1 "

3.2 Installation procedure



OSC 35 up to OSC 145 (left), OSC355 and OSC 600 (right)



OSC 825 and OSC 1200

Reference	Description
1	Service indicator (unit clogged)
2	Condensate inlet
3	Service indicator (oleophilic filter)
4	Condensate outlet
5	Tower 1
6	Tower 3
7	Tower 2
8	Diffuser
9	Condensate outlet (test)
10	Protector
A	Housing part 1
B	Housing part 2

Procedure

1. Install the OSC on a level floor, suitable for taking its weight.
 Keep in mind to reserve sufficient free space for replacement of the filters (see section Maintenance).
2. **On OSC 355 and OSC 600:**
 If the three towers stand in one line, rotate the third tower to the front.

	It is possible to operate the unit with the three towers in line. However, it is recommended to rotate the third tower as described above for easy change of the activated carbon filter in the third tower. When the unit is operated with the towers in line, they have to be rotated in order to change the filter. Keep in mind that the unit in operation can be heavy. (See the operating weight in section Dimension drawing).

3. Stop the compressor and close the air outlet valve. Switch off the voltage. Depressurise the outlet piping by opening the manual condensate drain.

4. Connect the automatic drain of the compressor condensate trap to the condensate inlet of the OSC.
 The connection can be made using one or both condensate inlets. The piping diameter must be at least 6 mm . The flexible must be laid out in such a way that no pockets are formed where condensate can collect.
5. Connect the condensate outlet of the OSC to the sewer.
 The outlet piping should have a section, sufficient to allow the condensate to flow without building up pressure. An inner diameter of 19 mm (3/4 ") or larger is recommended. See section Dimension drawing for the connection dimensions.

	The OSC must be positioned higher than the sewer and the OSC outlet piping must be installed with a slight downward slope to the sewer.

4 Operating instructions

4.1 Putting into operation (commissioning)



- The plastic bag of the filters must be removed. Do not remove the net around the filters.
- The activated carbon filter in the second tower must be placed on the flow plate.
 On OSC 355 and OSC 600,
 do not remove the flow plate. On all other models, the flow plate is not removable.
- Check that the activated carbon filters do not float. If necessary, hold them submerged until they remain down.

Procedure

OSC 35 up to OSC 145:

1. Remove the lid of the first tower. Take out the oleophilic filter.
2. Remove the lid of the second tower and take out the activated carbon filter. Remove the plastic bag and put the filter back. Check that the top of the filter is just below the condensate outlet. If not, check that the filter is resting on the flow plate.
3. Pour clean water into the unit until the water comes out of the condensate outlet.
4. Put the oleophilic filter on the water surface in the first tower. **Do not push the filter down.**
5. Put back the lids.

OSC 355 up to OSC 1200:

1. Remove the lids. Take the oleophilic filter out of the first tower.
2. Remove the plastic bag from the activated carbon filter in the third tower. Put the filter back and check that the top of the filter is just below the condensate outlet. If not, check that the filter rests on the bottom of the vessel.
3. Take the small oleophilic filter and the activated carbon filter out of the second tower. Remove their bags. First put back the activated carbon filter, then the small oleophilic filter. Fit the lid and check that the service indicator is free to move.
4. Pour clean water into the unit until the water comes out of the condensate outlet.
5. Put the oleophilic filter back on the water surface of the first tower. **Do not push the filter down.**
6. Refit the lids.

OSC 2400:

The steps in section **OSC 355 up to OSC 1200** must be done for the left side and for the right side.

5 Maintenance

5.1 Maintenance

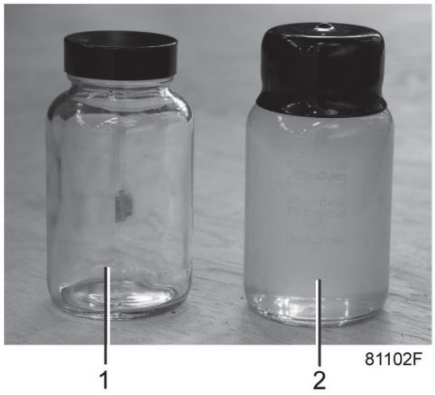
	Check the filters regularly as explained below in order to prevent untreated condensate from entering the sewer. Sample the condensate weekly.

	• If the filters are not installed properly, oil-containing condensate can leave the OSC. • • When new activated carbon filters are placed, the outgoing water may initially look black (caused by carbon dust). This is not harmful. • Each new filter is provided with a label. The correct position is marked on the label. • Used filters can be heavy. • See to it that no condensate comes into contact with eyes, mouth, …

Checking the condensate

Every week, a test sample should be collected during compressor operation.

1. Open the test valve and collect the condensate in the test bottle.
2. Compare the turbidity of the sample with the 15 ppm turbidity reference bottle.



Test/sample bottle (1) and turbidity reference bottle (2)

Oleophilic filter

	If the activated carbon filter has to be replaced, do this first (see section **Activated carbon filters**).

Initially, the oleophilic filter will float almost completely on the condensate and only the bottom part will act as filtration medium. By sorbing more and more oil, the filter will sink and new filter material will be exposed to the condensate.

The filter must be replaced when the service indicator (see section Introduction) approaches the lid of the tower.

The lifetime of the filter depends on the amount of oil in the condensate.

Replacement instructions

1. Stop the compressor and close the air outlet valve. Switch off the voltage. Depressurise the outlet piping by opening the manual condensate drain.
2. Remove the lid of the first tower and take out the oleophilic filter (4 - Flow diagram of OSC 35 up to OSC 145). **On OSC 355 up to OSC 1200**, remove also the lid of the second tower and remove also the small oleophilic filter (6 - View of OSC 355).
3. **Only if necessary** (see Problem solving, item 1), clean the inside of the OSC with water and tissue. **Do not use any form of soap or detergents** as they could contain dispersants which deteriorate the ability to break oil/water emulsions.
4. Fit the new filter (white label), observing the position. **Do not push the filter below the water surface.**
5. Fit the lid(s).
6. Remove the diffuser and pull out the mufflers. See section Introduction.
7. Fit the new mufflers and diffuser.

On OSC 2400: Repeat the instructions for OSC 355 up to OSC 1200 once for the left side of the unit and once for the right side of the unit.

Activated carbon filter(s)

The activated carbon filters must be replaced when:

- The oleophilic filters are changed for the second time.
- The filters get clogged.
 On OSC 355 up to OSC 2400, replace the filters when the service indicator (2 - View of OSC 355) is rising.
- The condensate from the test outlet is less transparent than in the reference glass.

Replacement instructions

1. Stop the compressor and close the air outlet valve. Switch off the voltage. Depressurise the compressor by opening the manual condensate drain.
2. Remove the lid of the second tower.
 Take out the activated carbon filter (7 - Flow diagram of OSC 35 up to OSC 145). **On OSC 355 up to OSC 1200,** take out the small oleophilic filter and replace also the activated carbon filter in the third tower.
3. Clean out the vessels with water and tissue. **Do not use any form of soap or detergents** as they could contain dispersants which deteriorate the ability to break oil/water emulsions.
4. Fit the new filter in the tower (activated carbon = black label), observing its position.
 On OSC 355 up to OSC 1200, put a new small oleophilic filter on top of the activated carbon filter (see section **Oleophilic filter**).
5. Refill with clean water until it comes out of the condensate outlet.

On OSC 2400: Repeat the instructions for OSC 355 up to OSC 1200 once for the left side of the unit and once for the right side of the unit.

5.2 Service kits

Atlas Copco has a complete range of service kits available. Service kits comprise all parts needed for servicing components and offer the benefits of using genuine Atlas Copco parts while keeping the maintenance budget low.



Service kits

1	Activated carbon filters
2	Oleophilic filters
3	Diffuser
4	Mufflers

For each type of OSC, three service kits are available:

- Service kit A comprises the material to change the oleophilic filter(s) once. It is a kit for the first service after installation when the condensate is in normal condition. After this, service kit B can be used.
- Service kit B comprises the material to change the oleophilic filter(s) twice and the activated carbon filter(s) once. This kit is also intended for use when the condensate is in normal condition. The lifetime of the carbon filter is twice as long as that of the oleophilic filter.
- Service kit D comprises the material to change the oleophilic filter(s) as well as the activated carbon filter(s) once. This kit should be used when the condensate contains a lot of oil, so that all the filters will be saturated at the same time.

OSC 35	**Part Number**
Service kit A	2901 1400 00
Service kit B	2901 1400 01
Service kit D	2901 1575 00

OSC 95	Part Number
Service kit A	2901 1401 00
Service kit B	2901 1401 01
Service kit D	2901 1576 00

OSC 145	Part Number
Service kit A	2901 1402 00
Service kit B	2901 1402 01
Service kit D	2901 1577 00

The service kits for OSC 35 up to OSC 145 comprise:

	Quantity, service kit A	Quantity, service kit B	Quantity, service kit D
Oleophilic filter	1	2	1
Activated carbon filter	0	1	1
Diffuser	1	2	1
Mufflers	1	2	1

OSC 355	Part Number
Service kit A	2901 1403 00
Service kit B	2901 1403 01
Service kit D	2901 1578 00

OSC 600	Part Number
Service kit A	2901 1404 00
Service kit B	2901 1404 01
Service kit D	2901 1579 00

OSC 825	Part Number
Service kit A	2901 1408 00
Service kit B	2901 1408 01
Service kit D	2901 1581 00

OSC 1200	Part Number
Service kit A	2901 1409 00
Service kit B	2901 1409 01
Service kit D	2901 1582 00

The service kits for OSC 355 up to OSC 1200 comprise:

	Quantity, service kit A	Quantity, service kit B	Quantity, service kit D
Oleophilic filter	1	2	1
Small oleophilic filter	1	2	1
Activated carbon filter	0	2	2
Diffuser	1	2	1
Mufflers	1	2	1

OSC 2400	Part Number
Service kit A	2901 1410 00
Service kit B	2901 1410 01
Service kit D	2901 1583 00

The service kits for OSC 2400 comprise:

	Quantity, service kit A	Quantity, service kit B	Quantity, service kit D
Oleophilic filter	2	4	2
Small oleophilic filter	2	4	2
Activated carbon filter	0	4	4
Diffuser	1	2	1
Mufflers	1	2	1

5.3 Disposal of used material

Used filters or any other used material (e.g. desiccant, lubricants, cleaning rags, machine parts, etc.) must be disposed of in an environmentally friendly and safe manner, and in line with the local recommendations and environmental legislation.

5.4 Spare parts

Spare parts

Parts OSC 35	Part Number
Lid of the first tower, indicator and protector (5-Flow diagram of OSC 35-145)	1622 2923 80
Lid of the second tower (8-Flow diagram of OSC 35-145)	1622 2924 00
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 95	Part Number
Lid of the first tower, indicator and protector (5-Flow diagram of OSC 35-145)	1622 2935 80
Lid of the second tower (8-Flow diagram of OSC 35-145)	1622 2936 00
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 145	Part Number
Lid of the first tower, indicator and protector (5-Flow diagram of OSC 35-145)	1622 2935 80
Lid of the second tower (8-Flow diagram of OSC 35-145)	1622 2936 00
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 355	Part Number
Lid of the first tower, indicator and protector (8-View of OSC 355)	1622 2954 80
Lid of the second tower (9-View of OSC 355)	1622 2954 81
Lid of the third tower (10-View of OSC 355)	1622 2955 00
Flexible between first and second tower	1622 2953 01
Elbow	0571 0020 50
Nipple	0571 0020 51
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 600	Part Number
Lid of the first tower, indicator and protector (8-View of OSC 355)	1622 2954 80
Lid of the second tower (9-View of OSC 355)	1622 2954 81
Lid of the third tower (10-View of OSC 355)	1622 2955 00
Flexible between first and second tower	1622 2953 01
Elbow	0571 0020 50
Nipple	0571 0020 51
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 825	Part Number
Lid of the first tower, indicator and protector (8-View of OSC 355)	1622 2999 80
Lid of the second tower (9-View of OSC 355)	1622 2999 81
Lid of the third tower (10-View of OSC 355)	1622 3000 00
Flexible between first and second tower	1622 2953 02
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 1200	Part Number
Lid of the first tower, indicator and protector (8-View of OSC 355)	1622 2999 80
Lid of the second tower (9-View of OSC 355)	1622 2999 81
Lid of the third tower (10-View of OSC 355)	1622 3009 00
Flexible between first and second tower	1622 2953 02
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 2400	Part Number
Lid of the first tower, indicator and protector (8-View of OSC 355)	1622 2999 80
Lid of the second tower (9-View of OSC 355)	1622 2999 81
Lid of the third tower (10-View of OSC 355)	1622 3009 00
Flexible between first and second tower	1622 2953 02
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

5.5 Options

Alarm

Optional electronic alarm sensors are available warning the operator for condensate overflow and filter replacement.

Alarm	8092 2849 29

Manifold

An optional manifold is available for easy connection of several condensate lines into the unit.

Manifold for OSC 35 up to OSC 145	8070 2167 03
Manifold for OSC 355 up to OSC 2400	8070 2167 11

Anti-bacteria kit

An optional anti-bacteria kit is available to prevent the growth of bacteria in the unit.

Anti-bacteria kit	8092 2850 17

Anti-freezing kit

An optional heater kit is available to prevent the condensate from freezing.

Anti-freezing kit for OSC 35 up to OSC 145	8092 2848 95
Anti-freezing kit for OSC 355 up to OSC 600	8092 2849 03
Anti-freezing kit for OSC 825 up to OSC 1200	8092 2873 44
Anti-freezing kit for OSC 2400	2 x 8092 2873 44

6 Problem solving

	Condition	Fault	Remedy
1	A lot of oil entered the OSC.	Compressor malfunctioning	Replace all filters. Clean the vessels. Check the compressor.
2	The service indicator (3 - View of OSC 52) rises	Too much condensate flows into the OSC.	Check the compressor FAD (see section Technical data).
		The unit is clogged.	Replace the activated carbon filters. Check the flexible between the first and the second tower.

7 Technical data

7.1 Reference conditions and limitations

Reference conditions

Effective working pressure of the compressor	bar(e)	7
Effective working pressure of the compressor	psig	100
Compressor running hours per day	h	12
Oil type		Roto-Inject Fluid, Roto-Xtend Duty Fluid, Roto-Foodgrade Fluid
Compressor type		All types of GA oil injected compressors

The reference conditions for the OSC distinguish 3 climate types:

- Cold climate: ambient temperature of 15 °C (59 °F) and relative humidity of 60 %
- Mild climate: ambient temperature of 25 °C (77 ºF) and relative humidity of 60%
- Hot climate: ambient temperature of 35 °C (95 ºF) and relative humidity of 70%

Limitations for operation

Minimum inlet temperature	˚C	1
Minimum inlet temperature	˚F	33.80
Minimum ambient temperature	˚C	1
Minimum ambient temperature	˚F	33.80
Maximum condensate inlet temperature	˚C	75
Maximum condensate inlet temperature	˚F	167
Maximum oil content at outlet of the OSC	mg/l	15

Note: maximum oil flow rate 10.5 g/h (0.37 oz/h)

7.2 Technical data

Compressor FAD

	For poly-glycol based condensates, the capacity of each unit should be halved.

Installation with compressors, air receivers, filters and dryers:

Models		OSC 35	OSC 95	OSC 145	OSC 355	OSC 600	OSC 825	OSC 1200	OSC 2400
Cold climate	l/s	65	180	270	665	1150	1550	2220	4440
Cold climate	cfm	138	382	572	1410	2438	3286	4706	9413
Mild climate	l/s	35	95	145	355	605	825	1180	2360
Mild climate	cfm	75	201	307	753	1283	1749	2502	5003
Hot climate	l/s	17	45	70	170	290	400	570	1145
Hot climate	cfm	36	95	148	360	615	848	1208	2427

Installation with compressors, air receivers and filters:

Models		OSC 35	OSC 95	OSC 145	OSC 355	OSC 600	OSC 825	OSC 1200	OSC 2400
Cold climate	l/s	105	280	415	1035	1800	2410	3450	6895
Cold climate	cfm	223	594	880	2194	3816	5110	7315	14620
Mild climate	l/s	45	118	175	435	760	1020	1455	2910
Mild climate	cfm	95	250	371	922	1611	2162	3085	6170
Hot climate	l/s	20	50	75	190	330	440	630	1260
Hot climate	cfm	42	105	160	403	700	933	1336	2671

Correction factors

For operation in other than reference conditions, multiply the compressor capacity (FAD) with the appropriate correction factors.

Running hours per day	8	10	12	14	16	18	20	22	24
Correction factor	1.50	1.20	1.00	0.86	0.75	0.67	0.60	0.55	0.50

Separation performance

For an outlet oil carry-over of 10 mg/l instead of 15 mg/l, multiply the unit capacity by 2/3.



In order to be First in Mind-First in Choice® for all your quality compressed air needs, Atlas Copco delivers the products and services that help to increase your business' efficiency and profitability.

Atlas Copco's pursuit of innovation never ceases, driven by our need for reliability and efficiency. Always working with you, we are committed to providing you the customized quality air solution that is the driving force behind your business.

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Condensate management



OSC 35, OSC 95, OSC 145, OSC 355, OSC 600, OSC 825, OSC 1200, OSC 2400

Instruction book

Atlas Copco

Condensate management

OSC 35, OSC 95, OSC 145, OSC 355, OSC 600, OSC 825, OSC 1200, OSC 2400

Instruction book

Original instructions

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This instruction book is valid for CE as well as non-CE labelled machines. It meets the requirements for instructions specified by the applicable European directives as identified in the Declaration of Conformity.

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1 Safety precautions

1.1 Safety icons

Explanation

	Danger for life
	Warning
	Important note

1.2 Safety precautions during installation

	All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

General precautions

1. The operator must employ safe working practices and observe all related local work safety requirements and regulations.
2. If any of the following statements does not comply with local legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorised, trained, specialised personnel.
4. Before carrying out any maintenance, repair work, adjustment or any other non-routine checks, stop the device. In addition, the power isolating switch must be opened and locked.

Precautions during installation

1. Place the device where the ambient air is as cool and clean as possible.
2. During installation or any other intervention on one of the connected machines, the machine must be stopped, de-energized and the isolating switch opened and locked before any maintenance or repair. As a further safeguard, persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the start equipment.
3. The electrical connections must correspond to the local codes. The device must be earthed and protected against short circuits by fuses in all phases. A lockable power isolating switch must be installed near the device.
4. For machines controlled by a central control system, a sign stating "This machine may start without warning" must be affixed near the instrument panel.
5. In multiple compressor systems, manual valves must be installed to isolate each compressor. Non-return valves (check valves) must not be relied upon for isolating pressure systems.

6. Never remove or tamper with the safety devices.

	Also consult following safety precautions: Safety precautions during operation and Safety precautions during maintenance or repair. These precautions apply to electrical devices. For precautions applying to the connected equipment consult the relevant instruction book. Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your device.

1.3 Safety precautions during operation

	All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

General precautions

1. The operator must employ safe working practices and observe all related local work safety requirements and regulations.
2. If any of the following statements does not comply with local legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorised, trained, specialised personnel.
4. Before carrying out any maintenance, repair work, adjustment or any other non-routine checks, stop the device. In addition, the power isolating switch must be opened and locked.

Precautions during operation

1. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
2. Never operate the device in the presence of flammable or toxic fumes, vapours or particles.
3. Never operate the machine below or in excess of its limit ratings.
4. Keep all bodywork doors and panels closed during operation. The doors may be opened for short periods only, e.g. to carry out routine checks. Wear ear protectors when opening a door if applicable.
5. People staying in environments or rooms where the sound pressure level reaches or exceeds 90 dB(A) shall wear ear protectors.
6. Periodically check that:
 - All guards and fasteners are in place and tight
 - All hoses and/or pipes are in good condition, secure and not rubbing
 - There are no leaks
 - All electrical leads are secure and in good order
7. Never remove or tamper with the safety devices.



Also consult following safety precautions: Safety precautions during installation and Safety precautions during maintenance or repair.
These precautions apply to electrical devices.
For precautions applying to the connected equipment consult the relevant instruction book.
Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.4 Safety precautions during maintenance or repair



All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

General precautions

1. The operator must employ safe working practices and observe all related local work safety requirements and regulations.
2. If any of the following statements does not comply with local legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorised, trained, specialised personnel.
4. Before carrying out any maintenance, repair work, adjustment or any other non-routine checks, stop the device. In addition, the power isolating switch must be opened and locked.

Precautions during maintenance or repair

1. Use only the correct tools for maintenance and repair work.
2. Use only genuine spare parts.
3. A warning sign bearing a legend such as "work in progress; do not start" shall be attached to the starting equipment, including all remote start equipment.
4. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
5. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapours of cleaning liquids.
6. Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.
7. Never use a light source with open flame for inspecting the interior of the device.
8. All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action.
9. Before clearing the device for use after maintenance or repair, check that operating pressures, temperatures and time settings are correct. Check that all control and shut-down devices are fitted and that they function correctly.
10. Never use caustic solvents which can damage materials of the air net.

	Also consult following safety precautions: Safety precautions during installation and Safety precautions during operation. These precautions apply to electrical devices. For precautions applying to the connected equipment consult the relevant instruction book. Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

	Units and/or used parts should be disposed of in an environmentally friendly and safe manner and in line with the local recommendations and legislation.

2 General description

2.1 Introduction

Compressed air produced by oil-injected compressors contains a small quantity of oil. During the cooling of the air in the aftercooler and in the refrigeration dryer (on compressors with built-in refrigeration dryer), oil-containing condensate is formed.

OSC are condensate treatment devices, designed to separate the major part of this oil from the condensate and absorb it in filters.

They are insensitive to shocks and vibration because of the use of filters and can be used with all types of drains. The condensate meets the requirements of the environmental codes.

The number in the model designation is the air capacity of the compressor in litres per second (see section Technical data).

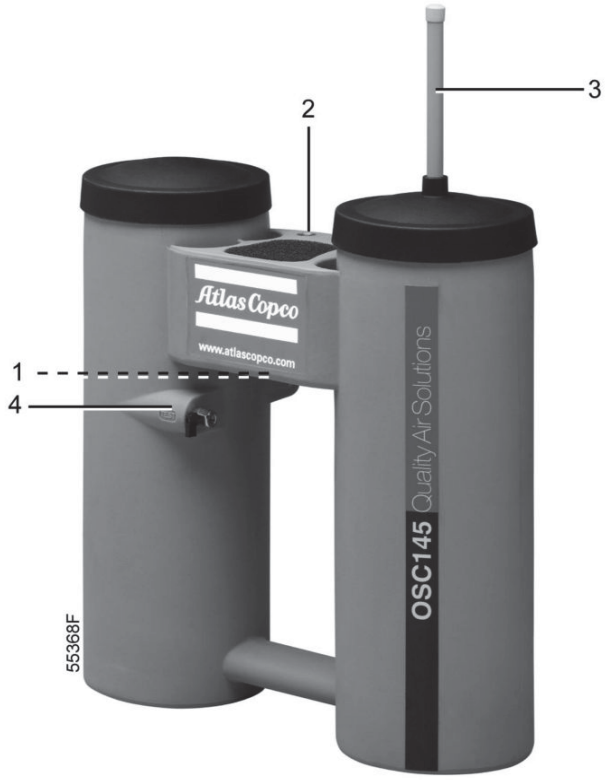
OSC 35 up to OSC 145 have two towers and are called two-step units.

OSC 355 up to OSC 1200 have three towers and are called three-step units.

OSC 2400 have six towers. They consist of two three-step units.

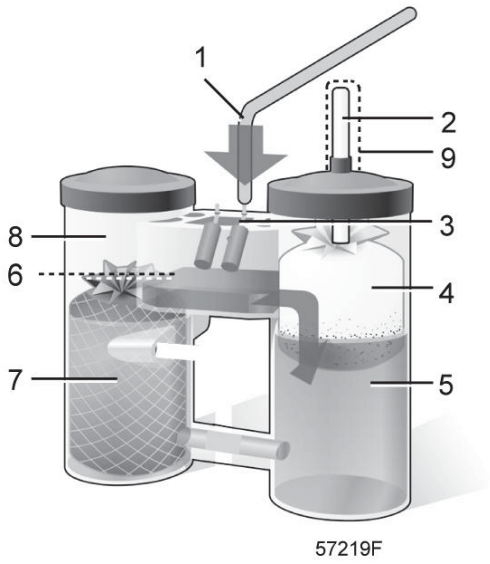
2.2 Operation

OSC 35 up to OSC 145:



OSC 145

1	Condensate outlet (at rear side)
2	Condensate inlet
3	Service indicator
4	Test outlet



Flow diagram (OSC 35 up to OSC 145)

1	Condensate inlet
2	Service indicator (oleophilic filter)
3	Mufflers
4	Oleophilic filter
5	First tower
6	Condensate outlet
7	Activated carbon filter
8	Second tower
9	Protector

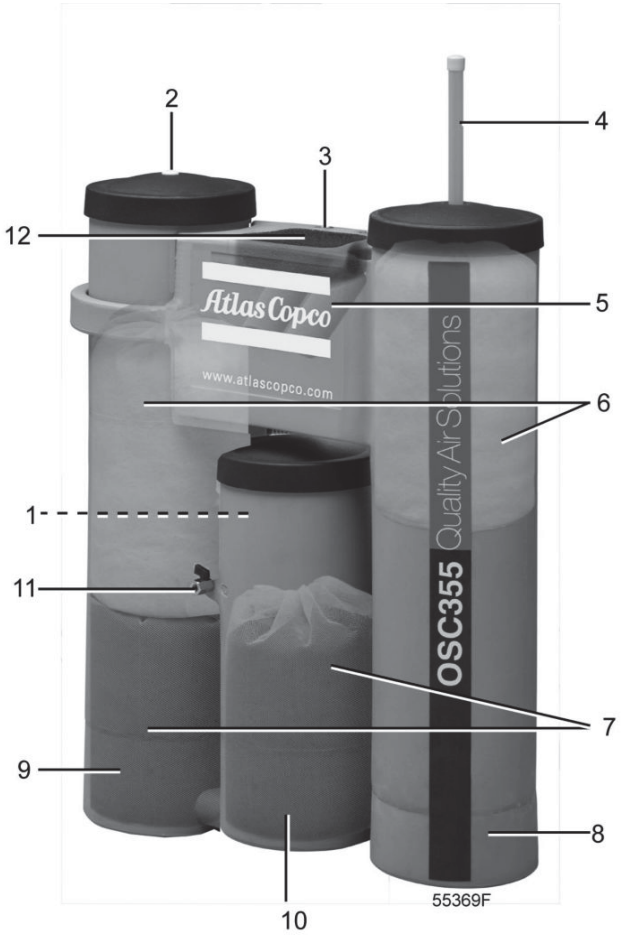
The condensate, containing fine oil droplets, enters the unit via mufflers (3) and is depressurised. The condensate flows to the first tower and seeps through an oleophilic filter (4), which absorbs most of the oil.

The water from the first tower, still containing a small quantity of oil, gradually flows to a second tower (8), where an activated carbon filter (7) is fitted. This filter absorbs almost all of the remaining oil.

The clean condensate is drained to the condensate outlet (.

The oleophilic filter floats on the water. The more oil the filter absorbs, the deeper it will sink, and service indicator (2) will move downwards with the filter. The filter must be replaced when the service indicator is down.

OSC 355 up to OSC 2400:



OSC 355

1	Condensate outlet (at rear side)
2	Service indicator (unit clogged)
3	Condensate inlet
4	Service indicator (oleophilic filter)
5	Mufflers
6	Oleophilic filters
7	Activated carbon filters
8	First tower
9	Second tower
10	Third tower
11	Test outlet
12	Diffuser

The condensate, containing fine oil droplets, enters the unit via mufflers (5) and is depressurised. The condensate flows to the first tower and seeps through an oleophilic filter, which absorbs most of the oil.

The water from the first tower, still containing a small quantity of oil, gradually flows to a second tower (9), where two filters are fitted: a small oleophilic filter, which absorbs some more oil from the condensate, and an activated carbon filter (7). The activated carbon filter starts to absorb the remaining oil in the condensate. The condensate gradually flows to a third tower (10), where another activated carbon filter is fitted, which absorbs almost all of the remaining oil.

The clean condensate is drained to the condensate outlet (1).

The oleophilic filter floats on the water. The more oil the filter absorbs, the deeper it will sink, and service indicator (2) will move downwards with the filter. The filter must be replaced when the service indicator is down.

3 Installation

3.1 Dimension drawing

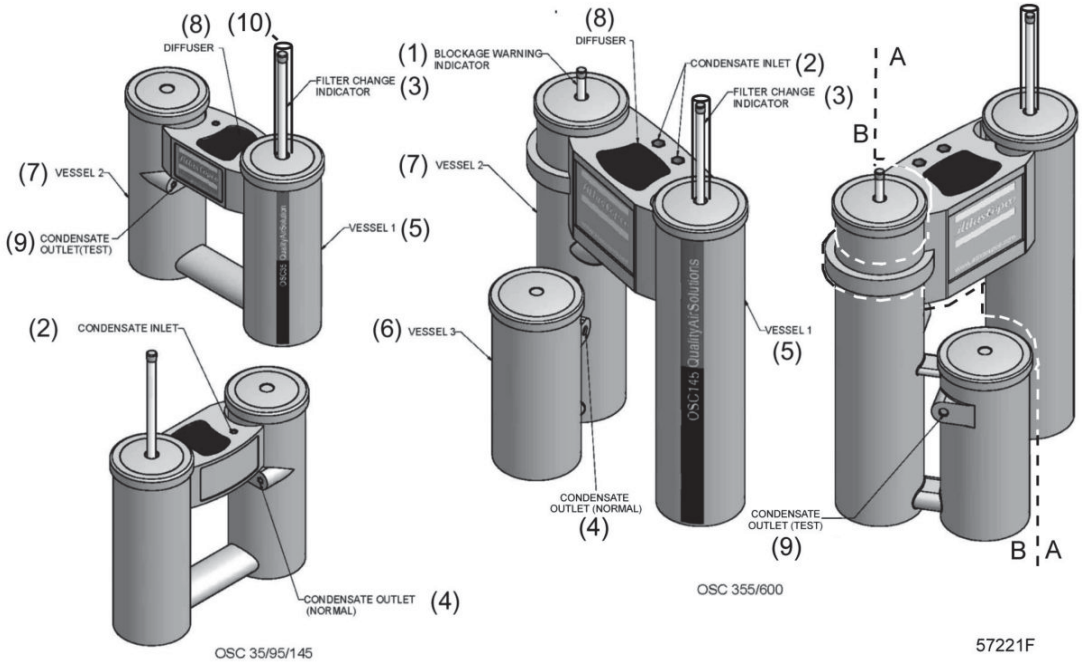


	OSC 35	OSC 95	OSC 145	OSC 355	OSC 600	OSC 825	OSC 1200	OSC 2400
A (mm)	470	680	680	750	750	945	945	945
A (inch)	18.5	26.7	26.7	29.5	29.5	37.2	37.2	37.2
B (mm)	165	255	255	546	546	650	695	1185
B (inch)	6.4	10	10	21.4	21.4	25.5	27.3	46.6
C (mm)	745	940	940	1100	1330	1450	1450	1450
C (inch)	29.3	37	37	43.3	52.3	57	57	57
Shipping weight (kg)	4	13	15	25	26	28	30	60
Shipping weight (lb)	8.8	28.6	33	55.1	57.3	61.7	66.1	132.2
Operating weight (kg)	16	51	53	80	103	151	164	324
Operating weight (lb)	35.2	112.4	116.8	176.3	227	332.8	361.5	714.2

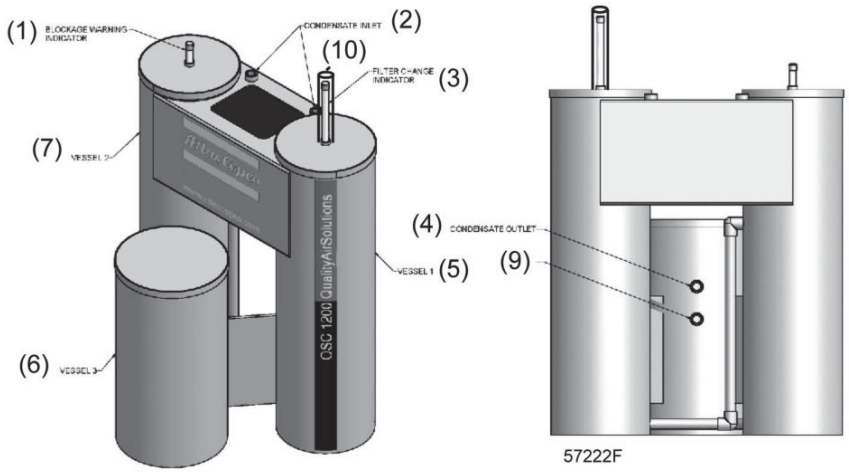
Model	Connections	
	Inlet BSP/NPT	Outlet BSP/NPT
OSC 35	1 x 1/2 "	1 x 1/2 "
OSC 95	2 x 1/2 "	1 x 1/2 "
OSC 145	2 x 1/2 "	1 x 1/2 "
OSC 355	2 x 3/4 "	1 x 3/4 "
OSC 600	2 x 3/4 "	1 x 3/4 "

Model	Connections	
	Inlet BSP/NPT	**Outlet BSP/NPT**
OSC 825	2 x 3/4 "	1 x 3/4 "
OSC 1200	2 x 3/4 "	1 x 3/4 "
OSC 2400	2 x 3/4 "	1 x 1 "

3.2 Installation procedure



OSC 35 up to OSC 145 (left), OSC355 and OSC 600 (right)



OSC 825 and OSC 1200

Reference	Description
1	Service indicator (unit clogged)
2	Condensate inlet
3	Service indicator (oleophilic filter)
4	Condensate outlet
5	Tower 1
6	Tower 3
7	Tower 2
8	Diffuser
9	Condensate outlet (test)
10	Protector
A	Housing part 1
B	Housing part 2

Procedure

1. Install the OSC on a level floor, suitable for taking its weight.
 Keep in mind to reserve sufficient free space for replacement of the filters (see section Maintenance).
2. **On OSC 355 and OSC 600:**
 If the three towers stand in one line, rotate the third tower to the front.

	It is possible to operate the unit with the three towers in line. However, it is recommended to rotate the third tower as described above for easy change of the activated carbon filter in the third tower. When the unit is operated with the towers in line, they have to be rotated in order to change the filter. Keep in mind that the unit in operation can be heavy. (See the operating weight in section Dimension drawing).

3. Stop the compressor and close the air outlet valve. Switch off the voltage. Depressurise the outlet piping by opening the manual condensate drain.

4. Connect the automatic drain of the compressor condensate trap to the condensate inlet of the OSC.
 The connection can be made using one or both condensate inlets. The piping diameter must be at least 6 mm . The flexible must be laid out in such a way that no pockets are formed where condensate can collect.
5. Connect the condensate outlet of the OSC to the sewer.
 The outlet piping should have a section, sufficient to allow the condensate to flow without building up pressure. An inner diameter of 19 mm (3/4 ") or larger is recommended. See section Dimension drawing for the connection dimensions.

	The OSC must be positioned higher than the sewer and the OSC outlet piping must be installed with a slight downward slope to the sewer.

4 Operating instructions

4.1 Putting into operation (commissioning)



- The plastic bag of the filters must be removed. Do not remove the net around the filters.
- The activated carbon filter in the second tower must be placed on the flow plate.
 On OSC 355 and OSC 600,
 do not remove the flow plate. On all other models, the flow plate is not removable.
- Check that the activated carbon filters do not float. If necessary, hold them submerged until they remain down.

Procedure

OSC 35 up to OSC 145:

1. Remove the lid of the first tower. Take out the oleophilic filter.
2. Remove the lid of the second tower and take out the activated carbon filter. Remove the plastic bag and put the filter back. Check that the top of the filter is just below the condensate outlet. If not, check that the filter is resting on the flow plate.
3. Pour clean water into the unit until the water comes out of the condensate outlet.
4. Put the oleophilic filter on the water surface in the first tower. **Do not push the filter down.**
5. Put back the lids.

OSC 355 up to OSC 1200:

1. Remove the lids. Take the oleophilic filter out of the first tower.
2. Remove the plastic bag from the activated carbon filter in the third tower. Put the filter back and check that the top of the filter is just below the condensate outlet. If not, check that the filter rests on the bottom of the vessel.
3. Take the small oleophilic filter and the activated carbon filter out of the second tower. Remove their bags. First put back the activated carbon filter, then the small oleophilic filter. Fit the lid and check that the service indicator is free to move.
4. Pour clean water into the unit until the water comes out of the condensate outlet.
5. Put the oleophilic filter back on the water surface of the first tower. **Do not push the filter down.**
6. Refit the lids.

OSC 2400:

The steps in section **OSC 355 up to OSC 1200** must be done for the left side and for the right side.

5 Maintenance

5.1 Maintenance

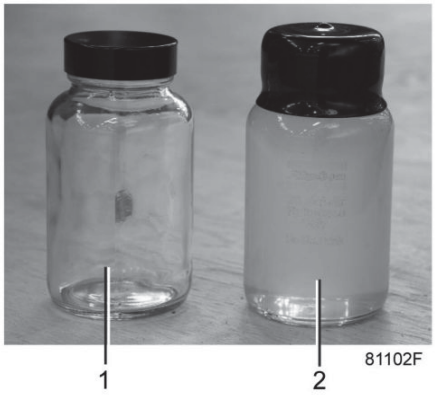
	Check the filters regularly as explained below in order to prevent untreated condensate from entering the sewer. Sample the condensate weekly.

	• If the filters are not installed properly, oil-containing condensate can leave the OSC. • • When new activated carbon filters are placed, the outgoing water may initially look black (caused by carbon dust). This is not harmful. • Each new filter is provided with a label. The correct position is marked on the label. • Used filters can be heavy. • See to it that no condensate comes into contact with eyes, mouth, …

Checking the condensate

Every week, a test sample should be collected during compressor operation.

1. Open the test valve and collect the condensate in the test bottle.
2. Compare the turbidity of the sample with the 15 ppm turbidity reference bottle.



Test/sample bottle (1) and turbidity reference bottle (2)

Oleophilic filter

	If the activated carbon filter has to be replaced, do this first (see section **Activated carbon filters**).

Initially, the oleophilic filter will float almost completely on the condensate and only the bottom part will act as filtration medium. By sorbing more and more oil, the filter will sink and new filter material will be exposed to the condensate.

The filter must be replaced when the service indicator (see section Introduction) approaches the lid of the tower.

The lifetime of the filter depends on the amount of oil in the condensate.

Replacement instructions

1. Stop the compressor and close the air outlet valve. Switch off the voltage. Depressurise the outlet piping by opening the manual condensate drain.
2. Remove the lid of the first tower and take out the oleophilic filter (4 - Flow diagram of OSC 35 up to OSC 145). **On OSC 355 up to OSC 1200**, remove also the lid of the second tower and remove also the small oleophilic filter (6 - View of OSC 355).
3. **Only if necessary** (see Problem solving, item 1), clean the inside of the OSC with water and tissue. **Do not use any form of soap or detergents** as they could contain dispersants which deteriorate the ability to break oil/water emulsions.
4. Fit the new filter (white label), observing the position. **Do not push the filter below the water surface.**
5. Fit the lid(s).
6. Remove the diffuser and pull out the mufflers. See section Introduction.
7. Fit the new mufflers and diffuser.

On OSC 2400: Repeat the instructions for OSC 355 up to OSC 1200 once for the left side of the unit and once for the right side of the unit.

Activated carbon filter(s)

The activated carbon filters must be replaced when:

- The oleophilic filters are changed for the second time.
- The filters get clogged.
 On OSC 355 up to OSC 2400, replace the filters when the service indicator (2 - View of OSC 355) is rising.
- The condensate from the test outlet is less transparent than in the reference glass.

Replacement instructions

1. Stop the compressor and close the air outlet valve. Switch off the voltage. Depressurise the compressor by opening the manual condensate drain.
2. Remove the lid of the second tower.
 Take out the activated carbon filter (7 - Flow diagram of OSC 35 up to OSC 145). **On OSC 355 up to OSC 1200,** take out the small oleophilic filter and replace also the activated carbon filter in the third tower.
3. Clean out the vessels with water and tissue. **Do not use any form of soap or detergents** as they could contain dispersants which deteriorate the ability to break oil/water emulsions.
4. Fit the new filter in the tower (activated carbon = black label), observing its position.
 On OSC 355 up to OSC 1200, put a new small oleophilic filter on top of the activated carbon filter (see section **Oleophilic filter**).
5. Refill with clean water until it comes out of the condensate outlet.

On OSC 2400: Repeat the instructions for OSC 355 up to OSC 1200 once for the left side of the unit and once for the right side of the unit.

5.2 Service kits

Atlas Copco has a complete range of service kits available. Service kits comprise all parts needed for servicing components and offer the benefits of using genuine Atlas Copco parts while keeping the maintenance budget low.



Service kits

1	Activated carbon filters
2	Oleophilic filters
3	Diffuser
4	Mufflers

For each type of OSC, three service kits are available:

- Service kit A comprises the material to change the oleophilic filter(s) once. It is a kit for the first service after installation when the condensate is in normal condition. After this, service kit B can be used.
- Service kit B comprises the material to change the oleophilic filter(s) twice and the activated carbon filter(s) once. This kit is also intended for use when the condensate is in normal condition. The lifetime of the carbon filter is twice as long as that of the oleophilic filter.
- Service kit D comprises the material to change the oleophilic filter(s) as well as the activated carbon filter(s) once. This kit should be used when the condensate contains a lot of oil, so that all the filters will be saturated at the same time.

OSC 35	**Part Number**
Service kit A	2901 1400 00
Service kit B	2901 1400 01
Service kit D	2901 1575 00

OSC 95	Part Number
Service kit A	2901 1401 00
Service kit B	2901 1401 01
Service kit D	2901 1576 00

OSC 145	Part Number
Service kit A	2901 1402 00
Service kit B	2901 1402 01
Service kit D	2901 1577 00

The service kits for OSC 35 up to OSC 145 comprise:

	Quantity, service kit A	Quantity, service kit B	Quantity, service kit D
Oleophilic filter	1	2	1
Activated carbon filter	0	1	1
Diffuser	1	2	1
Mufflers	1	2	1

OSC 355	Part Number
Service kit A	2901 1403 00
Service kit B	2901 1403 01
Service kit D	2901 1578 00

OSC 600	Part Number
Service kit A	2901 1404 00
Service kit B	2901 1404 01
Service kit D	2901 1579 00

OSC 825	Part Number
Service kit A	2901 1408 00
Service kit B	2901 1408 01
Service kit D	2901 1581 00

OSC 1200	Part Number
Service kit A	2901 1409 00
Service kit B	2901 1409 01
Service kit D	2901 1582 00

The service kits for OSC 355 up to OSC 1200 comprise:

	Quantity, service kit A	Quantity, service kit B	Quantity, service kit D
Oleophilic filter	1	2	1
Small oleophilic filter	1	2	1
Activated carbon filter	0	2	2
Diffuser	1	2	1
Mufflers	1	2	1

OSC 2400	Part Number
Service kit A	2901 1410 00
Service kit B	2901 1410 01
Service kit D	2901 1583 00

The service kits for OSC 2400 comprise:

	Quantity, service kit A	Quantity, service kit B	Quantity, service kit D
Oleophilic filter	2	4	2
Small oleophilic filter	2	4	2
Activated carbon filter	0	4	4
Diffuser	1	2	1
Mufflers	1	2	1

5.3 Disposal of used material

Used filters or any other used material (e.g. desiccant, lubricants, cleaning rags, machine parts, etc.) must be disposed of in an environmentally friendly and safe manner, and in line with the local recommendations and environmental legislation.

5.4 Spare parts

Spare parts

Parts OSC 35	Part Number
Lid of the first tower, indicator and protector (5-Flow diagram of OSC 35-145)	1622 2923 80
Lid of the second tower (8-Flow diagram of OSC 35-145)	1622 2924 00
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 95	Part Number
Lid of the first tower, indicator and protector (5-Flow diagram of OSC 35-145)	1622 2935 80
Lid of the second tower (8-Flow diagram of OSC 35-145)	1622 2936 00
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 145	Part Number
Lid of the first tower, indicator and protector (5-Flow diagram of OSC 35-145)	1622 2935 80
Lid of the second tower (8-Flow diagram of OSC 35-145)	1622 2936 00
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 355	Part Number
Lid of the first tower, indicator and protector (8-View of OSC 355)	1622 2954 80
Lid of the second tower (9-View of OSC 355)	1622 2954 81
Lid of the third tower (10-View of OSC 355)	1622 2955 00
Flexible between first and second tower	1622 2953 01
Elbow	0571 0020 50
Nipple	0571 0020 51
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 600	Part Number
Lid of the first tower, indicator and protector (8-View of OSC 355)	1622 2954 80
Lid of the second tower (9-View of OSC 355)	1622 2954 81
Lid of the third tower (10-View of OSC 355)	1622 2955 00
Flexible between first and second tower	1622 2953 01
Elbow	0571 0020 50
Nipple	0571 0020 51
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 825	Part Number
Lid of the first tower, indicator and protector (8-View of OSC 355)	1622 2999 80
Lid of the second tower (9-View of OSC 355)	1622 2999 81
Lid of the third tower (10-View of OSC 355)	1622 3000 00
Flexible between first and second tower	1622 2953 02
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 1200	Part Number
Lid of the first tower, indicator and protector (8-View of OSC 355)	1622 2999 80
Lid of the second tower (9-View of OSC 355)	1622 2999 81
Lid of the third tower (10-View of OSC 355)	1622 3009 00
Flexible between first and second tower	1622 2953 02
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

Parts OSC 2400	Part Number
Lid of the first tower, indicator and protector (8-View of OSC 355)	1622 2999 80
Lid of the second tower (9-View of OSC 355)	1622 2999 81
Lid of the third tower (10-View of OSC 355)	1622 3009 00
Flexible between first and second tower	1622 2953 02
Ball valve (for test outlet)	0852 0010 70
Reference glass	1622 6213 00

5.5 Options

Alarm

Optional electronic alarm sensors are available warning the operator for condensate overflow and filter replacement.

Alarm	8092 2849 29

Manifold

An optional manifold is available for easy connection of several condensate lines into the unit.

Manifold for OSC 35 up to OSC 145	8070 2167 03
Manifold for OSC 355 up to OSC 2400	8070 2167 11

Anti-bacteria kit

An optional anti-bacteria kit is available to prevent the growth of bacteria in the unit.

Anti-bacteria kit	8092 2850 17

Anti-freezing kit

An optional heater kit is available to prevent the condensate from freezing.

Anti-freezing kit for OSC 35 up to OSC 145	8092 2848 95
Anti-freezing kit for OSC 355 up to OSC 600	8092 2849 03
Anti-freezing kit for OSC 825 up to OSC 1200	8092 2873 44
Anti-freezing kit for OSC 2400	2 x 8092 2873 44

6 Problem solving

	Condition	Fault	Remedy
1	A lot of oil entered the OSC.	Compressor malfunctioning	Replace all filters. Clean the vessels. Check the compressor.
2	The service indicator (3 - View of OSC 52) rises	Too much condensate flows into the OSC.	Check the compressor FAD (see section Technical data).
		The unit is clogged.	Replace the activated carbon filters. Check the flexible between the first and the second tower.

7 Technical data

7.1 Reference conditions and limitations

Reference conditions

Effective working pressure of the compressor	bar(e)	7
Effective working pressure of the compressor	psig	100
Compressor running hours per day	h	12
Oil type		Roto-Inject Fluid, Roto-Xtend Duty Fluid, Roto-Foodgrade Fluid
Compressor type		All types of GA oil injected compressors

The reference conditions for the OSC distinguish 3 climate types:

- Cold climate: ambient temperature of 15 °C (59 °F) and relative humidity of 60 %
- Mild climate: ambient temperature of 25 °C (77 ºF) and relative humidity of 60%
- Hot climate: ambient temperature of 35 °C (95 ºF) and relative humidity of 70%

Limitations for operation

Minimum inlet temperature	˚C	1
Minimum inlet temperature	˚F	33.80
Minimum ambient temperature	˚C	1
Minimum ambient temperature	˚F	33.80
Maximum condensate inlet temperature	˚C	75
Maximum condensate inlet temperature	˚F	167
Maximum oil content at outlet of the OSC	mg/l	15

Note: maximum oil flow rate 10.5 g/h (0.37 oz/h)

7.2 Technical data

Compressor FAD

	For poly-glycol based condensates, the capacity of each unit should be halved.

Installation with compressors, air receivers, filters and dryers:

Models		OSC 35	OSC 95	OSC 145	OSC 355	OSC 600	OSC 825	OSC 1200	OSC 2400
Cold climate	l/s	65	180	270	665	1150	1550	2220	4440
Cold climate	cfm	138	382	572	1410	2438	3286	4706	9413
Mild climate	l/s	35	95	145	355	605	825	1180	2360
Mild climate	cfm	75	201	307	753	1283	1749	2502	5003
Hot climate	l/s	17	45	70	170	290	400	570	1145
Hot climate	cfm	36	95	148	360	615	848	1208	2427

Installation with compressors, air receivers and filters:

Models		OSC 35	OSC 95	OSC 145	OSC 355	OSC 600	OSC 825	OSC 1200	OSC 2400
Cold climate	l/s	105	280	415	1035	1800	2410	3450	6895
Cold climate	cfm	223	594	880	2194	3816	5110	7315	14620
Mild climate	l/s	45	118	175	435	760	1020	1455	2910
Mild climate	cfm	95	250	371	922	1611	2162	3085	6170
Hot climate	l/s	20	50	75	190	330	440	630	1260
Hot climate	cfm	42	105	160	403	700	933	1336	2671

Correction factors

For operation in other than reference conditions, multiply the compressor capacity (FAD) with the appropriate correction factors.

Running hours per day	8	10	12	14	16	18	20	22	24
Correction factor	1.50	1.20	1.00	0.86	0.75	0.67	0.60	0.55	0.50

Separation performance

For an outlet oil carry-over of 10 mg/l instead of 15 mg/l, multiply the unit capacity by 2/3.



In order to be First in Mind-First in Choice® for all your quality compressed air needs, Atlas Copco delivers the products and services that help to increase your business' efficiency and profitability.

Atlas Copco's pursuit of innovation never ceases, driven by our need for reliability and efficiency. Always working with you, we are committed to providing you the customized quality air solution that is the driving force behind your business.

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Oil-injected rotary screw compressors



GA 37 VSD, GA 45 VSD

Instruction book

Atlas Copco

Atlas Copco

Oil-injected rotary screw compressors

GA 37 VSD, GA 45 VSD

From following serial No. onwards: API 485 000

Instruction book

Original instructions

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This instruction book is valid for CE as well as non-CE labelled machines. It meets the requirements for instructions specified by the applicable European directives as identified in the Declaration of Conformity.

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1 Safety precautions

1.1 Safety icons

Explanation

	Danger for life
	Warning
	Important note

1.2 Safety precautions, general

General precautions

1. The operator must employ safe working practices and observe all related work safety requirements and regulations.
2. If any of the following statements does not comply with the applicable legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorized, trained, specialized personnel. The personnel should apply safe working practices by use of personal protection equipment, appropriate tools and defined procedures.
4. The compressor is not considered capable of producing air of breathing quality. For air of breathing quality, the compressed air must be adequately purified according to the applicable legislation and standards.
5. Before any maintenance, repair work, adjustment or any other non-routine checks, stop the compressor, press the emergency stop button, switch off the voltage and depressurize the compressor. In addition, the power isolating switch must be opened and locked.
 On units powered by a frequency converter, wait 10 minutes before starting any electrical repair.

	If the machine is equipped with an automatic restart after voltage failure function and if this function is active, be aware that the machine will restart automatically when the power is restored if it was running when the power was interrupted!

6. Never play with compressed air. Do not apply the air to your skin or direct an air stream at people. Never use the air to clean dirt from your clothes. When using the air to clean equipment, do so with extreme caution and wear eye protection.
7. The owner is responsible for maintaining the unit in safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.
8. It is prohibited to walk or stand on the unit or on its components.

1.3 Safety precautions during installation

	All responsibility for any damage or injury resulting from neglecting these precautions, or non observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

Precautions during installation

1. The machine must only be lifted using suitable equipment in accordance with the applicable safety regulations. Loose or pivoting parts must be securely fastened before lifting. It is strictly forbidden to dwell or stay in the risk zone under a lifted load. Lifting acceleration and deceleration must be kept within safe limits. Wear a safety helmet when working in the area of overhead or lifting equipment.
2. The unit is designed for indoor use. If the unit is installed outdoors, special precautions must be taken; consult your supplier.
3. In case the device is a compressor, place the machine where the ambient air is as cool and clean as possible. If necessary, install a suction duct. Never obstruct the air inlet. Care must be taken to minimize the entry of moisture at the inlet air.
4. Any blanking flanges, plugs, caps and desiccant bags must be removed before connecting the pipes.
5. Air hoses must be of correct size and suitable for the working pressure. Never use frayed, damaged or worn hoses. Distribution pipes and connections must be of the correct size and suitable for the working pressure.
6. In case the device is a compressor, the aspirated air must be free of flammable fumes, vapors and particles, e.g. paint solvents, that can lead to internal fire or explosion.
7. In case the device is a compressor, arrange the air intake so that loose clothing worn by people cannot be drawn in.
8. Ensure that the discharge pipe from the compressor to the aftercooler or air net is free to expand under heat and that it is not in contact with or close to flammable materials.
9. No external force may be exerted on the air outlet valve; the connected pipe must be free of strain.
10. If remote control is installed, the machine must bear a clear sign stating: DANGER: This machine is remotely controlled and may start without warning.
 The operator has to make sure that the machine is stopped and depressurized and that the electrical isolating switch is open, locked and labelled with a temporary warning before any maintenance or repair. As a further safeguard, persons switching on or off remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the start equipment.
11. Air-cooled machines must be installed in such a way that an adequate flow of cooling air is available and that the exhausted air does not recirculate to the compressor air inlet or cooling air inlet.
12. The electrical connections must correspond to the applicable codes. The machines must be earthed and protected against short circuits by fuses in all phases. A lockable power isolating switch must be installed near the compressor.
13. On machines with automatic start/stop system or if the automatic restart function after voltage failure is activated, a sign stating "This machine may start without warning" must be affixed near the instrument panel.
14. In multiple compressor systems, manual valves must be installed to isolate each compressor. Non-return valves (check valves) must not be relied upon for isolating pressure systems.
15. Never remove or tamper with the safety devices, guards or insulation fitted on the machine. Every pressure vessel or auxiliary installed outside the machine to contain air above atmospheric pressure must be protected by a pressure relieving device or devices as required.

16. Piping or other parts with a temperature in excess of 70˚C (158˚F) and which may be accidentally touched by personnel in normal operation must be guarded or insulated. Other high temperature piping must be clearly marked.
17. For water-cooled machines, the cooling water system installed outside the machine has to be protected by a safety device with set pressure according to the maximum cooling water inlet pressure.
18. If the ground is not level or can be subject to variable inclination, consult the manufacturer.
19. If the device is a dryer and no free extinguishing system is present in the air net close to the dryer, safety valves must be installed in the vessels of the dryer.

	Also consult following safety precautions: Safety precautions during operation and Safety precautions during maintenance. These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein. Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.4 Safety precautions during operation

	All responsibility for any damage or injury resulting from neglecting these precautions, or non observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

Precautions during operation

1. Never touch any piping or components of the compressor during operation.
2. Use only the correct type and size of hose end fittings and connections. When blowing through a hose or air line, ensure that the open end is held securely. A free end will whip and may cause injury. Make sure that a hose is fully depressurized before disconnecting it.
3. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
4. Never operate the machine when there is a possibility of taking in flammable or toxic fumes, vapors or particles.
5. Never operate the machine below or in excess of its limit ratings.
6. Keep all bodywork doors shut during operation. The doors may be opened for short periods only, e.g. to carry out routine checks. Wear ear protectors when opening a door.
 On compressors without bodywork, wear ear protection in the vicinity of the machine.
7. People staying in environments or rooms where the sound pressure level reaches or exceeds 80 dB(A) shall wear ear protectors.
8. Periodically check that:
 - All guards are in place and securely fastened
 - All hoses and/or pipes inside the machine are in good condition, secure and not rubbing
 - No leaks occur
 - All fasteners are tight
 - All electrical leads are secure and in good order
 - Safety valves and other pressure relief devices are not obstructed by dirt or paint
 - Air outlet valve and air net, i.e. pipes, couplings, manifolds, valves, hoses, etc. are in good repair, free of wear or abuse

- Air cooling filters of the electrical cabinet are not clogged

9. If warm cooling air from compressors is used in air heating systems, e.g. to warm up a workroom, take precautions against air pollution and possible contamination of the breathing air.
10. On water-cooled compressors using open circuit cooling towers, protective measures must be taken to avoid the growth of harmful bacteria such as Legionella pneumophila bacteria.
11. Do not remove any of, or tamper with, the sound-damping material.
12. Never remove or tamper with the safety devices, guards or insulations fitted on the machine. Every pressure vessel or auxiliary installed outside the machine to contain air above atmospheric pressure shall be protected by a pressure relieving device or devices as required.
13. Yearly inspect the air receiver. Minimum wall thickness as specified in the instruction book must be respected. Local regulations remain applicable if they are more strict.

	Also consult following safety precautions: Safety precautions during installation and Safety precautions during maintenance. These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein. Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.5 Safety precautions during maintenance or repair

	All responsibility for any damage or injury resulting from neglecting these precautions, or non observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

Precautions during maintenance or repair

1. Always use the correct safety equipment (such as safety glasses, gloves, safety shoes, etc.).
2. Use only the correct tools for maintenance and repair work.
3. Use only genuine spare parts.
4. All maintenance work shall only be undertaken when the machine has cooled down.
5. A warning sign bearing a legend such as "Work in progress; do not start" shall be attached to the starting equipment.
6. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
7. Close the compressor air outlet valve and depressurize the compressor before connecting or disconnecting a pipe.
8. Before removing any pressurized component, effectively isolate the machine from all sources of pressure and relieve the entire system of pressure.
9. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapours of cleaning liquids.
10. Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.
11. Never weld or perform any operation involving heat near the oil system. Oil tanks must be completely purged, e.g. by steam cleaning, before carrying out such operations. Never weld on, or in any way modify, pressure vessels.

12. Whenever there is an indication or any suspicion that an internal part of a machine is overheated, the machine shall be stopped but no inspection covers shall be opened before sufficient cooling time has elapsed; this to avoid the risk of spontaneous ignition of the oil vapour when air is admitted.
13. Never use a light source with open flame for inspecting the interior of a machine, pressure vessel, etc.
14. Make sure that no tools, loose parts or rags are left in or on the machine.
15. All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action.
16. Before clearing the machine for use after maintenance or overhaul, check that operating pressures, temperatures and time settings are correct. Check that all control and shut-down devices are fitted and that they function correctly. If removed, check that the coupling guard of the compressor drive shaft has been reinstalled.
17. Every time the separator element is renewed, examine the discharge pipe and the inside of the oil separator vessel for carbon deposits; if excessive, the deposits should be removed.
18. Protect the motor, air filter, electrical and regulating components, etc. to prevent moisture from entering them, e.g. when steam cleaning.
19. Make sure that all sound-damping material and vibration dampers, e.g. damping material on the bodywork and in the air inlet and outlet systems of the compressor, is in good condition. If damaged, replace it by genuine material from the manufacturer to prevent the sound pressure level from increasing.
20. Never use caustic solvents which can damage materials of the air net, e.g. polycarbonate bowls.
21. **The following safety precautions are stressed when handling refrigerant:**
 - Never inhale refrigerant vapours. Check that the working area is adequately ventilated; if required, use breathing protection.
 - Always wear special gloves. In case of refrigerant contact with the skin, rinse the skin with water. If liquid refrigerant contacts the skin through clothing, never tear off or remove the latter; flush abundantly with fresh water over the clothing until all refrigerant is flushed away; then seek medical first aid.

	Also consult following safety precautions: Safety precautions during installation and Safety precautions during operation. These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein. Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.6 Specific safety precautions for equipment with SMARTBOX

It is important to follow all regulations regarding the use of radio equipment, in particular to the possibility of radio frequency (RF) interference. Please follow the safety advice given below carefully.

- Respect the restrictions on the use of radio equipment in fuel depots, chemical plants or other explosive environments.
- Avoid **SMART**BOX operation close to personal medical devices (e.g. hearing aids and pacemakers). Consult the manufacturers of the medical device to determine if it is adequately protected.
- Avoid **SMART**BOX operation close to other electronic equipment. It may cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers recommendations.
- Respect a distance from the human body of at least 20 cm (0.66 ft) during operation.
- Do not operate the **SMART**BOX in areas where cellular modems are not advised without proper device certifications. These areas include environments where cellular radio can interfere such as explosive

atmospheres, medical equipment, or any other equipment which may be susceptible to any form of radio interference. The modem can transmit signals that could interfere with this equipment.

2 General description

2.1 Introduction

Introduction

GA 37 VSD and GA 45 VSD are single-stage, oil-injected screw compressors driven by an electric motor.

The compressors are enclosed in a sound-insulated bodywork and are available in air-cooled and water cooled version.

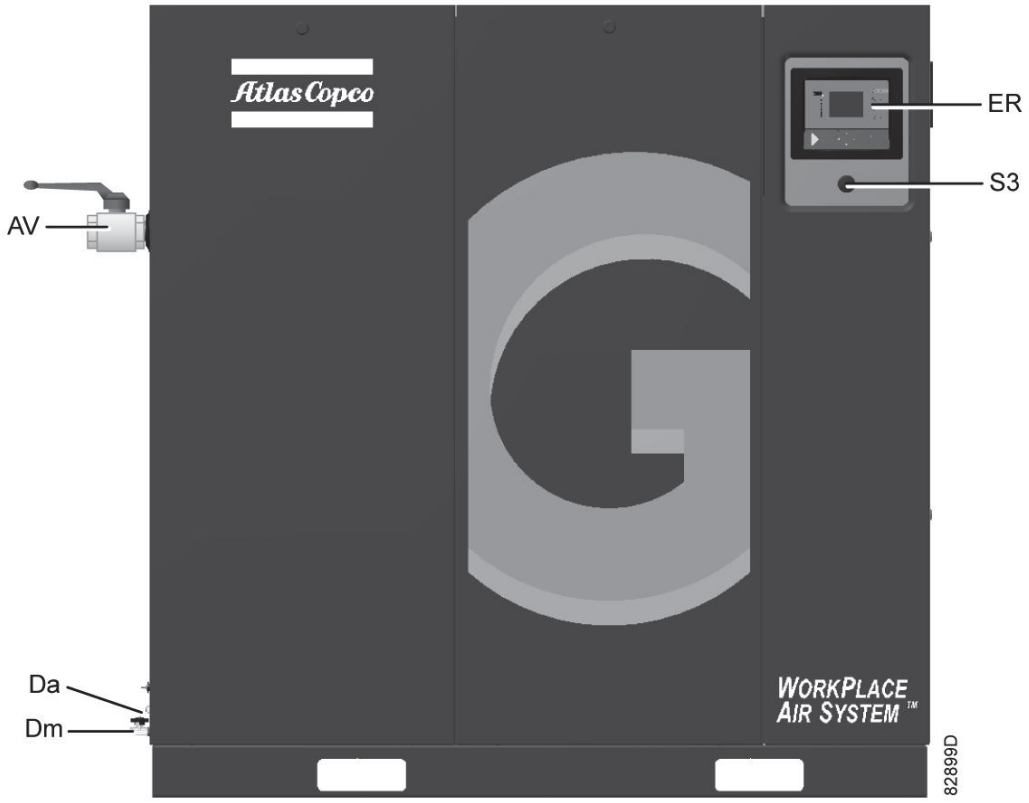
The compressors are controlled by the Atlas Copco Elektronikon® Graphic regulator.

The machine is **SMART**LINK-ready. **SMART**LINK is Atlas Copco's web-based platform to monitor compressed air installations.

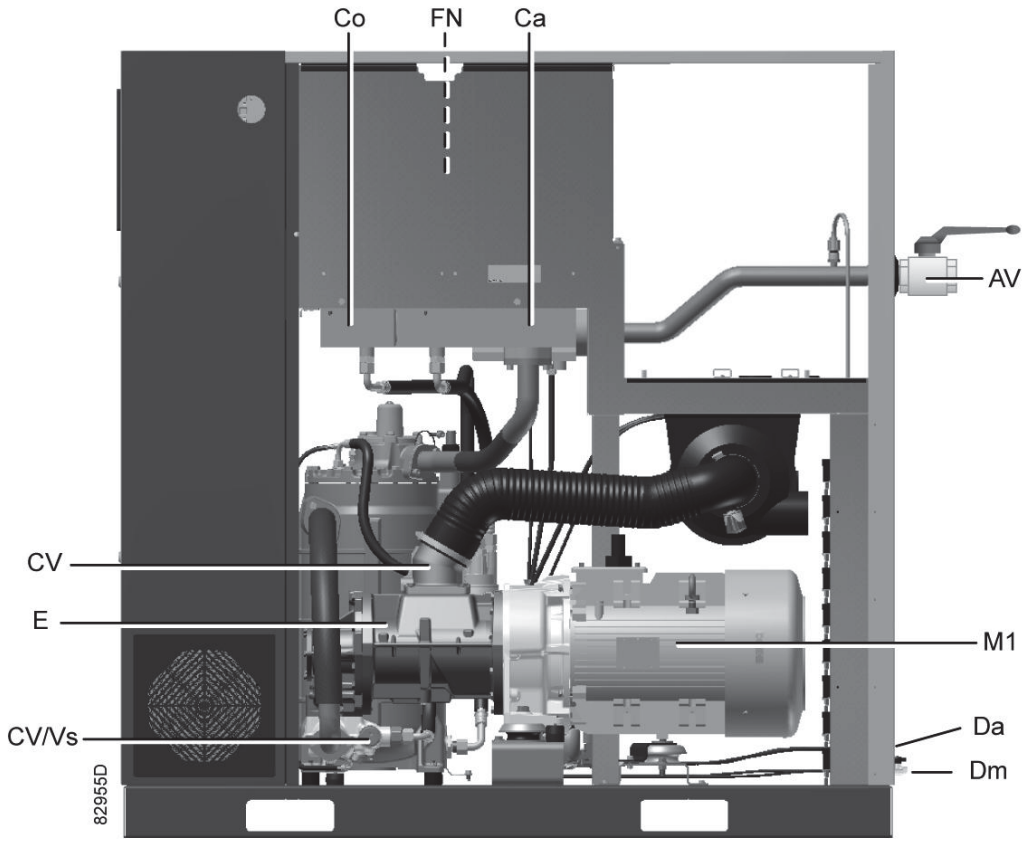
The electronic control module is fitted to the door at the right side. An electric cabinet comprising fuses, transformers, relays, etc. is located behind this panel.

Atlas Copco's integrated VSD (Variable Speed Drive) technology mirrors air usage, automatically adjusting the motor speed depending on the compressed air demand.

GA Workplace



Front view, GA 37 VSD and GA 45 VSD Workplace

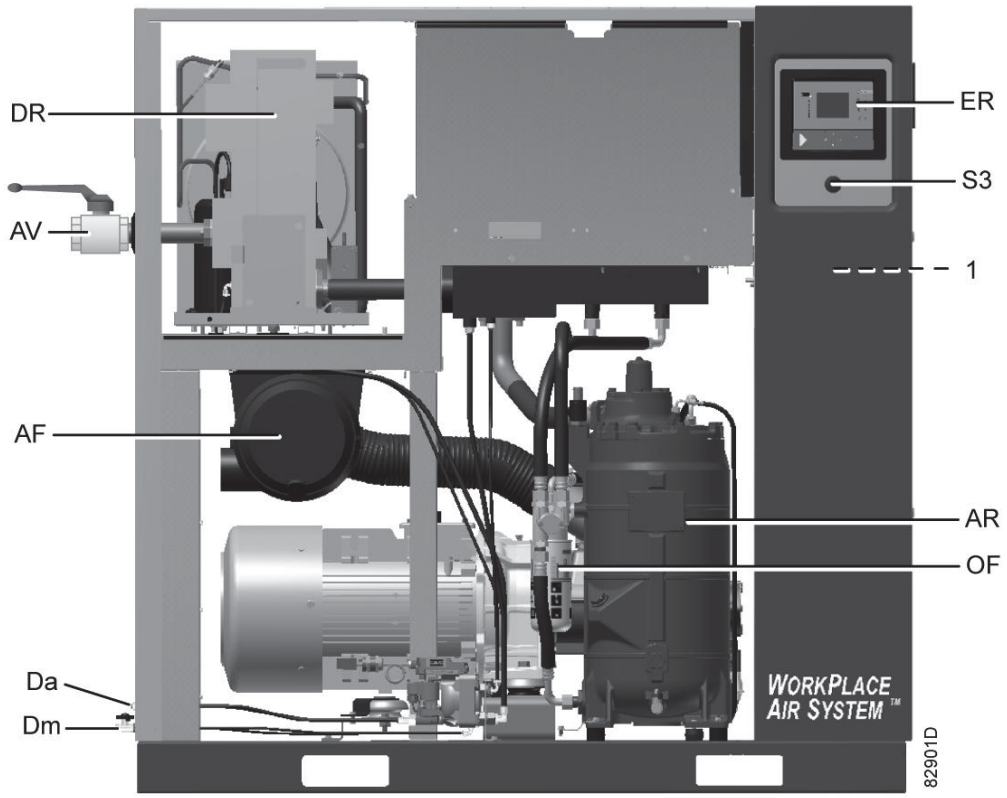


Rear view, GA 37 VSD and GA 45 VSD Workplace

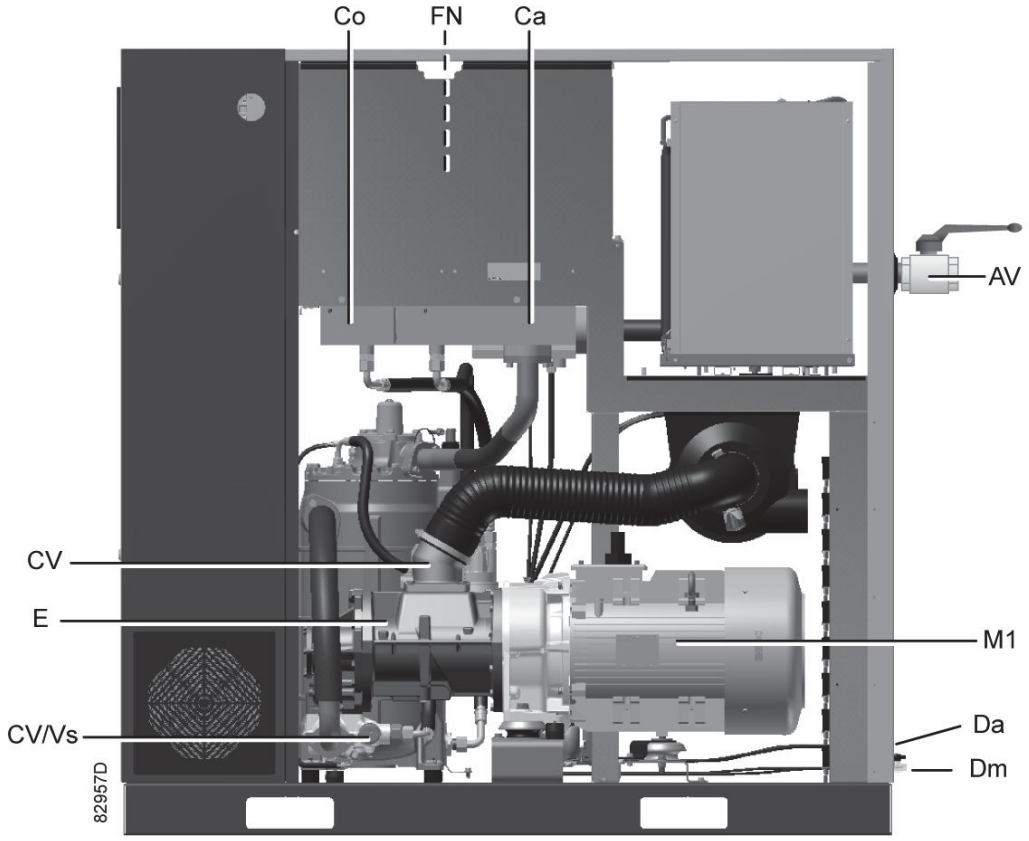
Reference	Name
AF	Air filter
AR	Air receiver
AV	Air outlet valve
Ca	Air cooler
Co	Oil cooler
CV/Vs	Check valve/oil stop valve
Da	Automatic condensate outlet
E	Compressor element
ER	Elektronikon® Graphic controller
FN	Cooling fan
M1	Drive motor
OF	Oil filter
S3	Emergency stop button
VP	Vent plug
1	Electric cabinet

GA Workplace Full-Feature

The Workplace Full Feature compressors are provided with an air dryer which is integrated in the sound-insulated bodywork. The dryer removes condensate from the compressed air by cooling the air to near freezing point.



Front view, GA 37 VSD up to GA 45 VSD Workplace Full-Feature



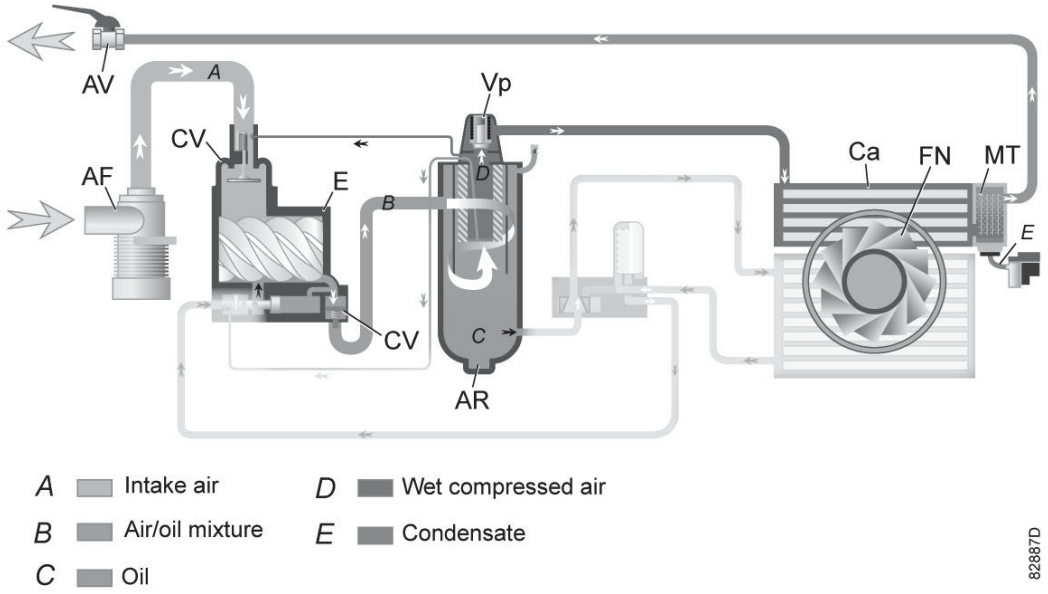
Rear view, GA 37 VSD up to GA 45 VSD Workplace Full-Feature

Reference	Name
AF	Air filter
AR	Air receiver
AV	Air outlet valve
Ca	Air cooler
Co	Oil cooler
CV/Vs	Check valve/oil stop valve
Da	Automatic condensate outlet
Da1	Automatic condensate outlet, dryer
DR	Dryer
E	Compressor element
ER	Elektronikon® Graphic controller
FN	Cooling fan
M1	Drive motor
OF	Oil filter
S3	Emergency stop button
VP	Vent plug

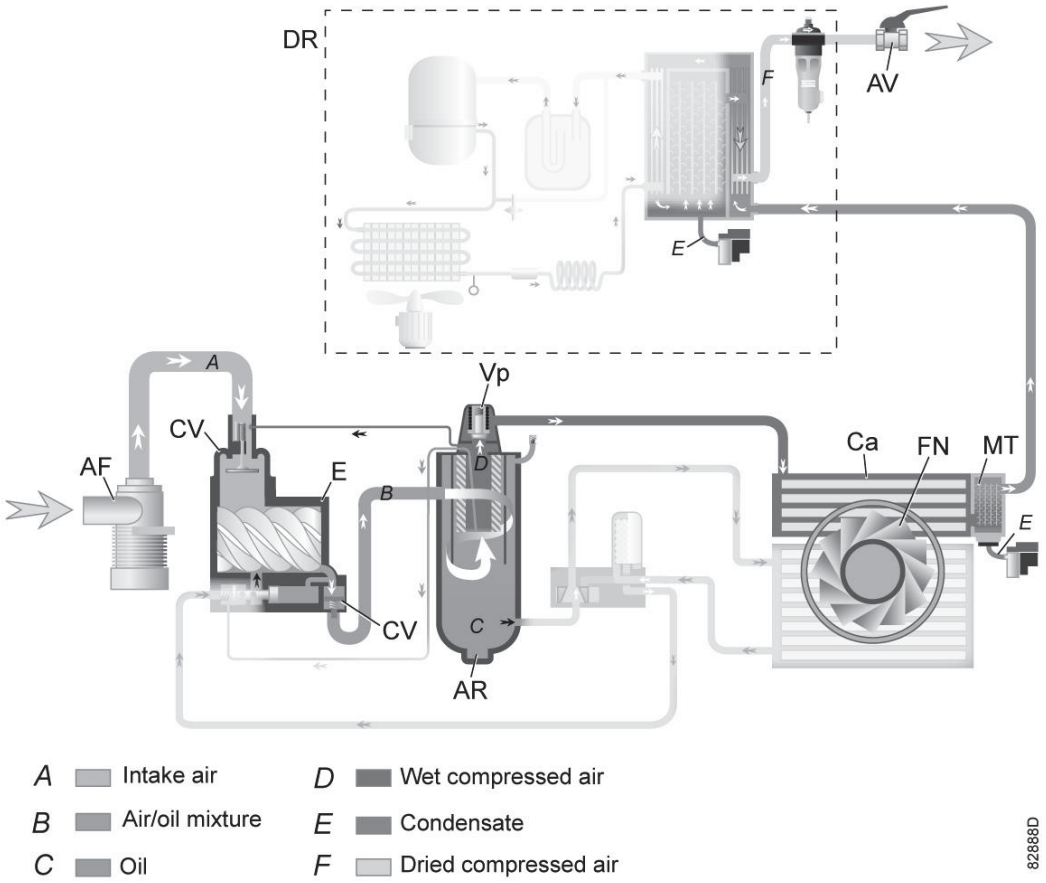
Reference	Name
1	Electric cubicle

2.2 Air flow

Flow diagrams



GA 37 VSD and GA 45 VSD Workplace



GA 37 VSD and GA 45 VSD Workplace Full-Feature

Reference	Description
A	Air inlet
B	Air/oil mixture
C	Oil
D	Wet compressed air
E	Condensate
F	Dry compressed air (Full-Feature)

Note: The cooling fan (FN) is not provided on water-cooled compressors.

Description

Air drawn in through filter (AF) and check valve (CV) is compressed in compressor element (E).

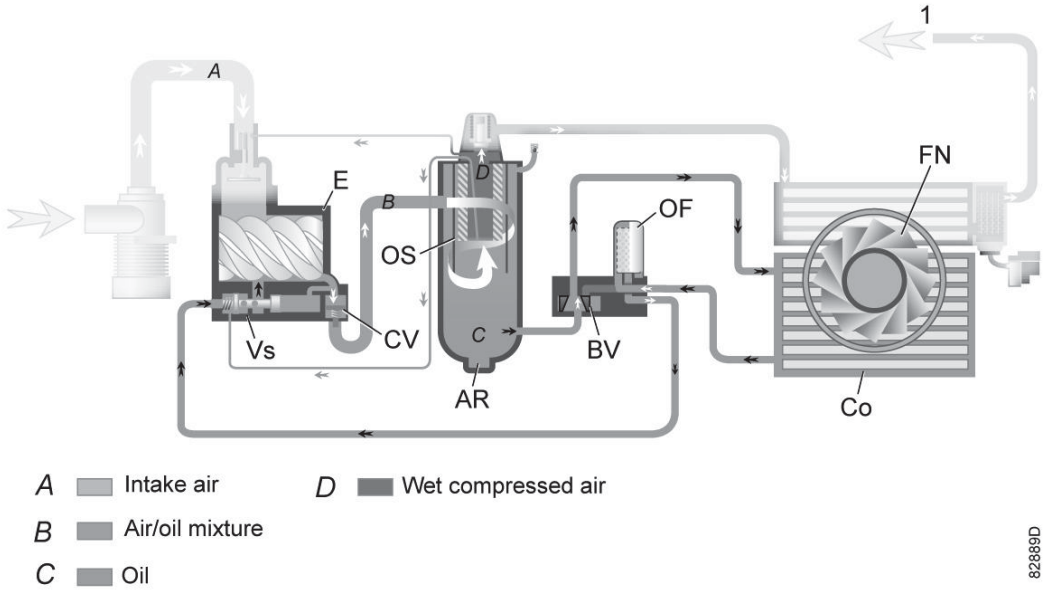
A mixture of compressed air and oil flows into the air receiver/oil separator (AR). The air is discharged through the outlet valve via minimum pressure valve (Vp), air cooler (Ca) and condensate trap (MT).

Minimum pressure valve (Vp) prevents the receiver pressure from dropping below a minimum pressure and includes a check valve which prevents blow-back of compressed air from the net.

Full-Feature compressors are provided with a dryer (DR).

2.3 Oil system

Flow diagram



Reference	Description
A	Air inlet
B	Air/oil mixture
C	Oil
D	Wet compressed air
1	To the air outlet valve in case of a Workplace version. To the dryer in case of a Workplace Full-Feature version.

Note: The cooling fan (FN) is not provided on water-cooled compressors.

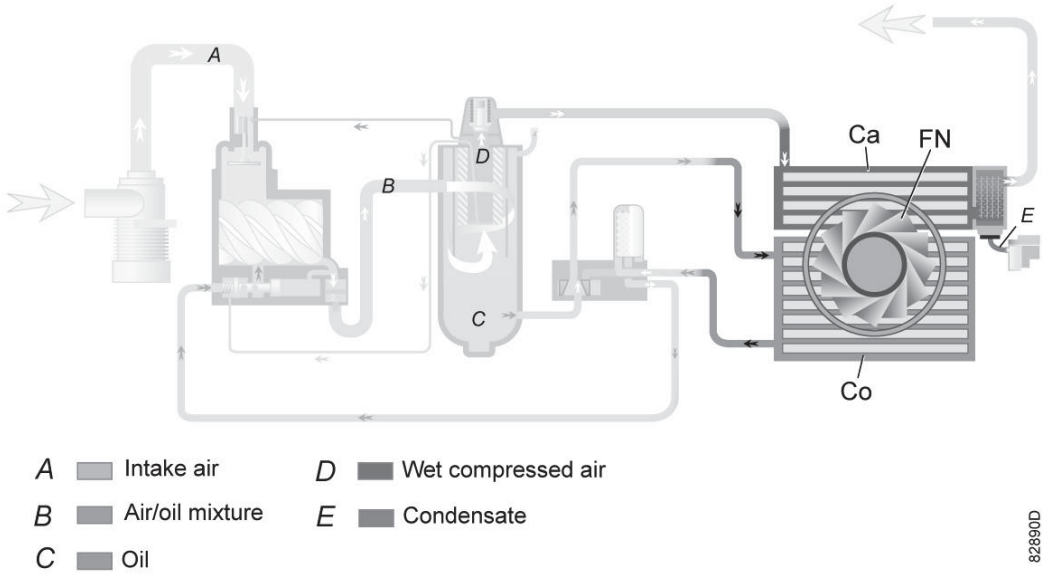
Description

In air receiver (AR) most of the oil is removed from the air/oil mixture by centrifugal action. The remaining oil is removed by oil separator (OS). The oil collects in the lower part of air receiver/oil separator (AR) which serves as oil tank.

The oil system is provided with a thermostatic bypass valve (BV). When the oil temperature is below 40 ˚C (104 ˚F), the bypass valve shuts off the oil supply from oil cooler (Co). Air pressure forces the oil from air receiver (AR) through oil filter (OF) and oil stop valve (Vs) to compressor element (E). Oil cooler (Co) is bypassed. When the oil temperature has increased to 40 ˚C (104 ˚F), bypass valve (BV) starts opening the supply from oil cooler (Co). At approx. 55 ˚C (131 ˚F), all the oil flows through the oil cooler.

2.4 Cooling system

Air-cooled compressors



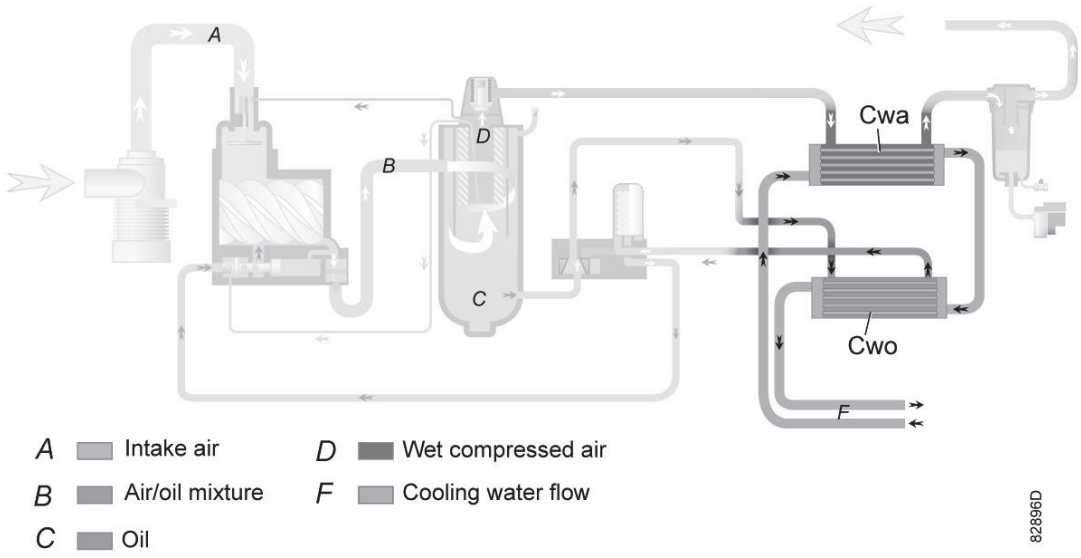
References	Description
A	Intake air
B	Air/oil mixture
C	Oil
D	Wet compressed air
E	Condensate

Description

The cooling system on air-cooled compressors comprises air cooler (Ca) and oil cooler (Co).

The cooling air flow is generated by fan (FN). This cooling fan is switched on and off depending on the operating conditions according a specific algorithm.

Water-cooled compressors



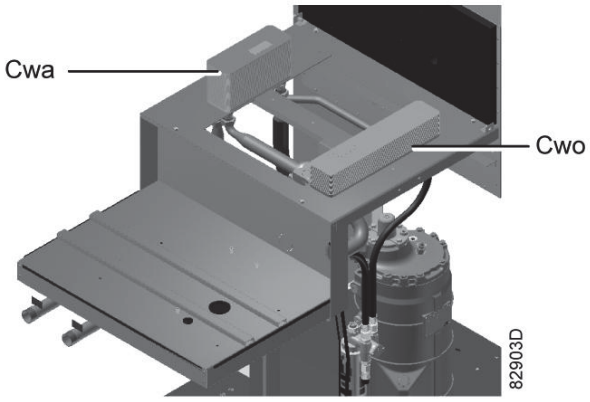
Cooling system, water-cooled compressors

References	Description
A	Intake air
B	Air/oil mixture
C	Oil
D	Wet compressed air
F	Water flow

Description

The cooling system on water-cooled compressors comprises air cooler (Cwa) and oil cooler (Cwo).

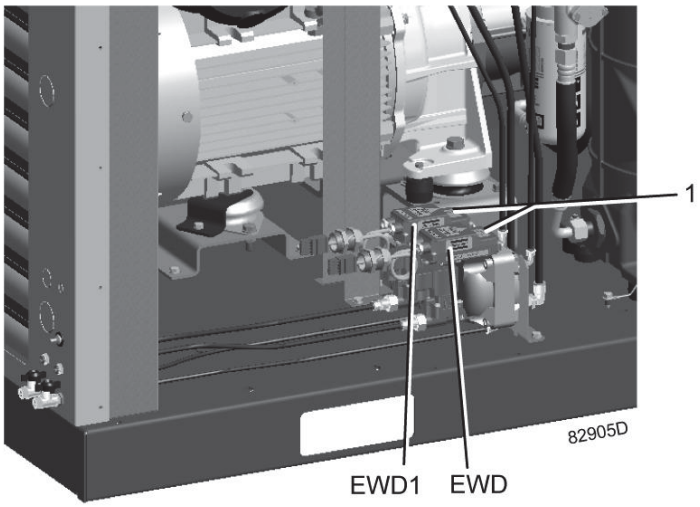
They are connected to a cooling water circuit. The water flows through the inlet pipe, the coolers and the outlet pipe.



Water-cooled air cooler and oil cooler

2.5 Condensate system

Drain connections



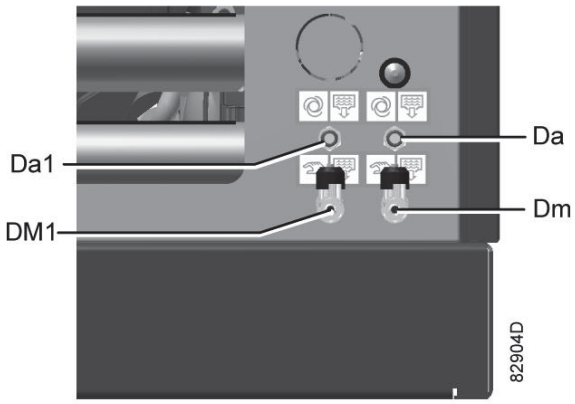
Electronic condensate drains, typical example

The compressors have an electronic water drain (EWD). The condensate formed in the air cooler accumulates in the collector. When the condensate reaches a certain level, it is discharged through the automatic drain outlet (Da).

On Full-Feature compressors, an additional electronic water drain (EWD1) is provided. The condensate trap of the heat exchanger is drained by EWD1 and discharged through automatic drain outlet (Da1).

See also section Air flow.

Testing the electronic water drain can be done by briefly pressing the test button (1) on top of the device.



Condensate drains, typical example

Reference	Designation
Da	Automatic drain connection
Dm	Manual drain connection
Da1	Automatic drain connection of the dryer (only on Full-Feature units)
Dm1	Manual drain connection of the dryer (only on Full-Feature units)

Beside each automatic drain outlet is a manual (Dm) condensate drain connection for manually draining of the condensate.

2.6 Regulating system

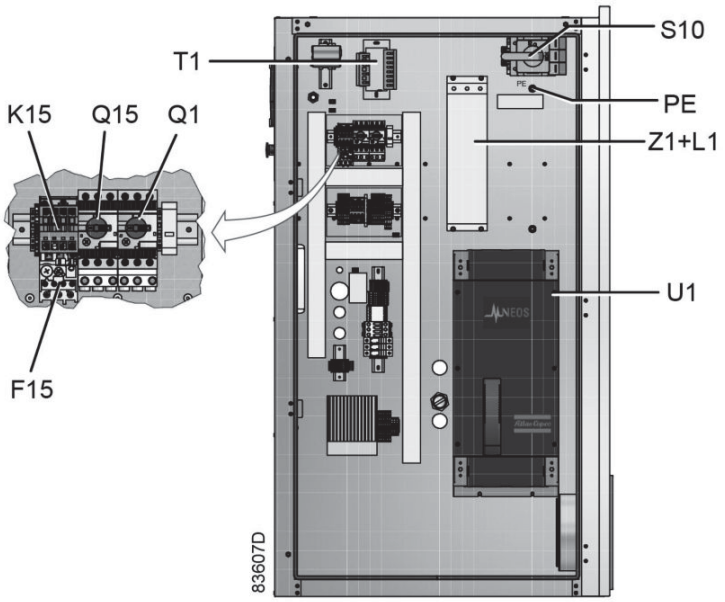
Description

If the consumption is less than the air output of the compressor, the net pressure increases. When the net pressure is higher than the set-point (desired net pressure), the regulator will decrease the motor speed. If the net pressure keeps on rising when the motor runs at minimum speed, the regulator stops the motor. If the motor is stopped automatically and the net pressure approaches the set-point, the regulator will restart the motor.

2.7 Electrical system

Electric components

The electrical system comprises the frequency converter Neos (or Control Technics optional) with the following components:



Electric cabinet for GA 37 VSD and GA 45 VSD, typical example

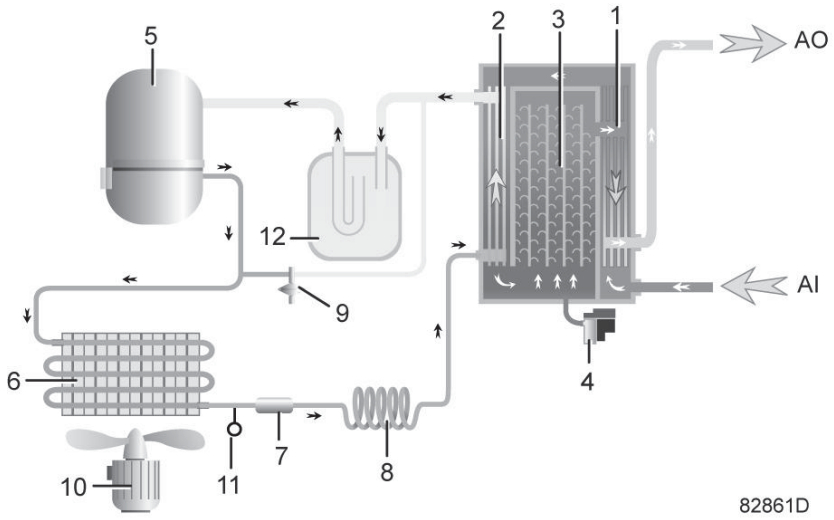
Reference	Designation
T1	Transformer
Q15	Circuit breaker
Q1	Circuit breaker
K15	Contactor
F15	Overload relay
Z1+L1	EMC filter and choke
U1	Frequency converter
PE	Earthing terminal
S10	Main switch (optional)

Electrical diagrams

The complete electrical diagram can be found in the electric cubicle.

2.8 Air dryer

Flow diagram



Air dryer

Reference	Name
AI	Air inlet
AO	Air outlet
1	Air/air heat exchanger
2	Air/refrigerant heat exchanger/evaporator
3	Condensate separator
4	Automatic drain / condensate outlet
5	Refrigerant compressor
6	Refrigerant condenser
7	Liquid refrigerant dryer/filter
8	Capillary
9	Bypass valve
10	Condenser cooling fan
11	Pressure switch, fan control
12	Liquid separator

Compressed air circuit

Compressed air enters heat exchanger (1) and is cooled by the outgoing, cold, dried air. Water in the incoming air starts to condense. The air then flows through heat exchanger/evaporator (2), where the refrigerant evaporates, causing the air to be cooled further to close to the evaporating temperature of the refrigerant. More water in the air condenses. The cold air then flows through separator (3) where all the condensate is separated from the air. The condensate is automatically drained through outlet (4).

The cold, dried air flows through heat exchanger (1) where it is warmed up by the incoming air.

Refrigerant circuit

	Refrigeration dryers of ID type contain high efficient refrigerant R410A of the HFC group.

Compressor (5) delivers hot, high-pressure refrigerant gas which flows through condenser (6) where most of the refrigerant condenses.

The liquid refrigerant flows through liquid refrigerant dryer/filter (7) to capillary tube (8). The refrigerant leaves the capillary tube at about evaporating pressure.

The refrigerant enters evaporator (2) where it withdraws heat from the compressed air by further evaporation at about constant pressure. The heated refrigerant leaves the evaporator and is sucked in by the compressor (5) through a liquid separator (12).

By-pass valve (9) regulates the refrigerant flow. Fan (10) is switched on or off by switch (11) depending on the pressure degree of the condensate.

3 Elektronikon® Graphic controller

3.1 Elektronikon® Graphic controller

Control panel



Display of the Elektronikon® Graphic controller

Introduction

The Elektronikon controller has following functions:

- Controlling the compressor
- Protecting the compressor
- Monitoring components subject to service
- Automatic restart after voltage failure (made inactive)

Automatic control of the compressor operation

The controller maintains the net pressure between programmable limits by automatically loading and unloading the compressor (on compressors running at a fixed speed) or by adapting the motor speed (compressors with frequency converter). A number of programmable settings, e.g. the unloading and loading pressures (for fixed speed compressors), the setpoint (for compressors with frequency converter), the minimum stop time and the maximum number of motor starts and several other parameters are hereby taken into account.

The controller stops the compressor whenever possible to reduce the power consumption and restarts it automatically when the net pressure decreases. In case the expected unloading period is too short, the compressor is kept running to prevent too short standstill periods.

	A number of time based automatic start/stop commands may be programmed. Take into account that a start command will be executed (if programmed and activated), even after manually stopping the compressor.

Protecting the compressor

Shut-down

Several sensors are provided on the compressor. If one of the measured signals exceeds the programmed shut-down level, the compressor will be stopped. This will be indicated on display (1) and general alarm LED (2) will blink.

Remedy the trouble and reset the message. See also the Inputs menu.

	Before remedying, consult the applicable safety precautions.

Shut-down warning

A shut-down warning level is a programmable level below the shut-down level.

If one of the measured signals exceeds the programmed shut-down warning level, a message will appear on display (1) and general alarm LED (2) will light up to warn the operator that the shut-down warning level is exceeded.

The message disappears as soon as the warning condition disappears.

Warning

A warning message will appear if, on Full-Feature compressors, the dew point temperature is too high in relation to the ambient temperature.

Service warning

A number of service operations are grouped (called Service Plans). Each Service Plan has a programmed time interval. If a time interval is exceeded, a message will appear on display (1) to warn the operator to carry out the service actions belonging to that Service Plan.

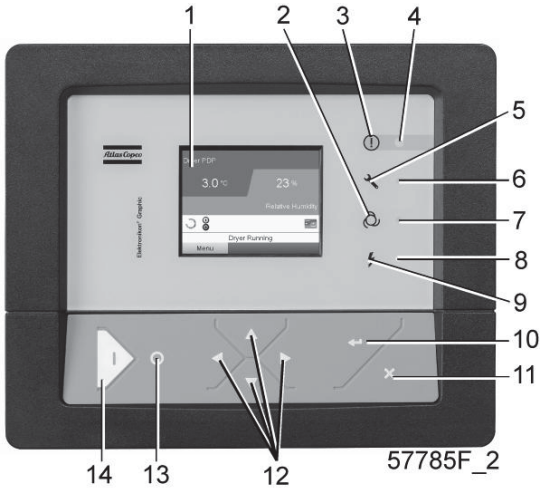
Automatic restart after voltage failure

The controller has a built-in function to automatically restart the compressor when the voltage is restored after voltage failure. For compressors leaving the factory, this function is made inactive. If desired, the function can be activated. Consult the Atlas Copco Customer Centre.

	If the function is activated and provided the regulator was in the automatic operation mode, the compressor will automatically restart if the supply voltage to the module is restored.

3.2 Control panel

Elektronikon regulator



Control panel

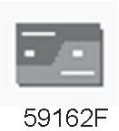
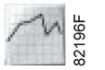
Parts and functions

Reference	Designation	Function
1	Display	Shows the compressor operating condition and a number of icons to navigate through the menu.
2	Pictograph	Automatic operation
3	Pictograph	General alarm
4	Alarm LED	Flashes in case of a shut-down, is lit in case of a warning condition.
5	Pictograph	Service
6	Service LED	Lights up if service is needed
7	Automatic operation LED	Indicates that the regulator is automatically controlling the compressor.
8	Voltage on LED	Indicates that the voltage is switched on.
9	Pictograph	Voltage
10	Enter key	Use this button to confirm the last action.
11	Escape key	Use this button to go to previous screen or to end the current action.
12	Scroll keys	Keys to scroll through the menu.
13	Stop button	Button to stop the compressor. LED (7) goes out.
14	Start button	Button to start the compressor. LED (7) lights up indicating that the Elektronikon regulator is operative.

3.3 Icons used

Status icons

Name	Icon	Description
Stopped / Running	 57786F	When the compressor is stopped, the icon stands still. When the compressor is running, the icon is rotating.
Compressor status	 57787F	Motor stopped
	 57788F	Running unloaded
	 57789F	Running loaded
Machine control mode	 57790F or  59161F	Local start / stop
	 57791F	Remote start / stop
	 57792F	Network control
Automatic restart after voltage failure	 57793F	Automatic restart after voltage failure is active
Week timer	 57794F	Week timer is active

Name	Icon	Description
Active protection functions	 57795F	Emergency stop
	 57796F	Shutdown
	 57797F	Warning
Service	 57798F	Service required
Main screen display	 59162F	Value lines display icon
	 82196F	Chart display icon
General icons	 81105D	No communication / network problem
	 82418D	Not valid

Input icons

Icon	Description
 57799F	Pressure
 57800F	Temperature
 57801F	Digital input
 57802F	Special protection

System icons

Icon	Description
 57803F	Compressor element (LP, HP, ...)
 57804F	Dryer
 57805F	Fan
 57806F	Frequency converter
 57807F	Drain
 57808F	Filter
 57809F	Motor
 57810F	Failure expansion module
 81105D	Network problem
 57812F	General alarm

Menu icons

Icon	Description
 57813F	Inputs
 57814F	Outputs
 57812F	Alarms (Warnings, shutdowns)
 57815F	Counters
 57816F or  82641D	Test

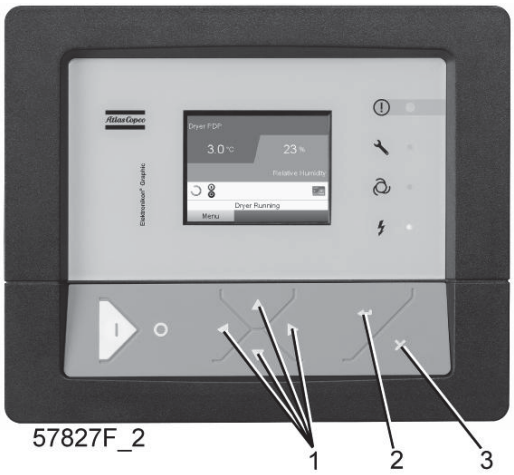
Icon	Description
 57817F	Settings
 57798F	Service
 57818F	Event history (saved data)
 57819F	Access key / User password
 57792F	Network
 57820F	Setpoint
 57867F	Info

Navigation arrows

Icon	Description
 57821F	Up
 57822F	Down

3.4 Main screen

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Function

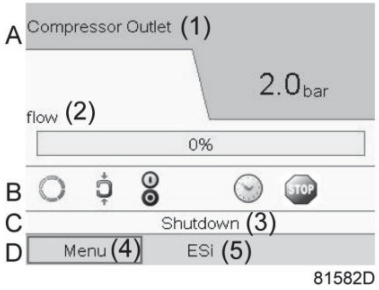
The Main screen is the screen that is shown automatically when the voltage is switched on and one of the keys is pushed. It is switched off automatically after a few minutes when no keys are pushed.

Typically, 5 different main screen views can be chosen:

1. Two value lines
2. Four value lines
3. Chart (High resolution)
4. Chart (Medium resolution)
5. Chart (Low resolution)

Two and four value lines screens

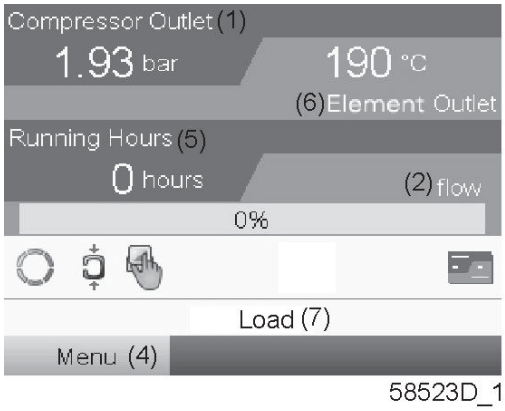
This type of Main screen shows the value of 2 or 4 parameters (see section Inputs menu).



Typical Main screen (2 value lines)

Text on figures

(1)	Compressor Outlet
(2)	Flow
(3)	Load, shutdown, ... (text varies upon the compressors actual condition)
(4)	Menu
(5)	Unload, ES,...(text varies upon the compressors actual condition)



Typical Main screen (4 value lines)

Text on figures

(1)	Compressor Outlet
(2)	Flow
(3)	Off, Shutdown,... (text varies upon the compressors actual condition)
(4)	Menu
(5)	Running hours
(6)	Element outlet
(7)	Load, Unload, ... (text varies upon the compressors actual condition)

- **Section A** shows information regarding the compressor operation (e.g. the outlet pressure or the temperature at the compressor outlet). On compressors with a frequency converter, the load degree (flow) is given in % of the maximum flow.
- **Section B** shows Status icons. Following icon types are shown in this field:
 - Fixed icons
 These icons are always shown in the main screen and cannot be selected by the cursor (e.g. Compressor stopped or running, Compressor status (running, running unloaded or motor stopped).
 - Optional icons
 These icons are only shown if their corresponding function is activated (e.g. week timer, automatic restart after voltage failure , etc.)
 - Pop up icons
 These icons pop up if an abnormal condition occurs (warnings, shutdowns, service,...)

 To call up more information about the icons shown, select the icon concerned using the scroll keys and press the enter key.
- **Section C** is called the Status bar
 This bar shows the text that corresponds to the selected icon.

- **Section D** shows the Action buttons. These buttons are used:
 - To call up or program settings
 - To reset a motor overload, service message or emergency stop
 - To have access to all data collected by the regulator

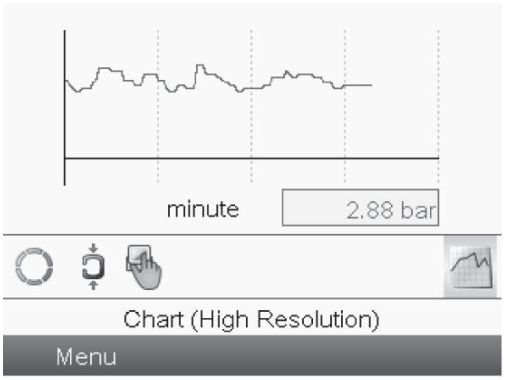
 The function of the buttons depends on the displayed menu. The most common functions are:

Designation	Function
Menu	To go to the menu
Modify	To modify programmable settings
Reset	To reset a timer or message

To activate an action button, highlight the button by using the Scroll keys and press the Enter key.
To go back to the previous menu, press the Escape key.

Chart views

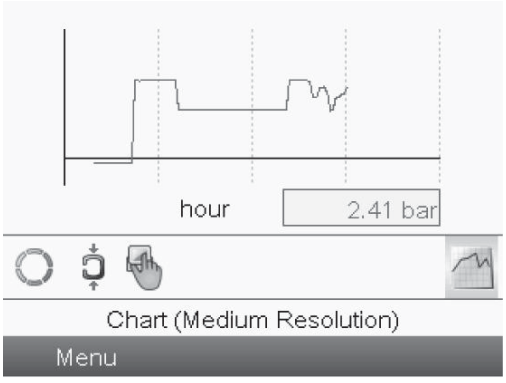
Instead of viewing values, it is also possible to view a graph of one of the input signals (see section Inputs menu) in function of the time.



59166D

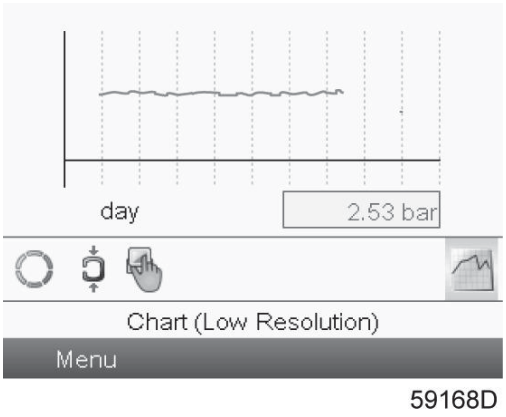
When Chart (High Resolution) is selected, the chart shows the variation of the selected input (in this case the pressure) per minute. Also the instantaneous value is displayed. The screen shows the last 4 minutes.

The switch button (icon) for selecting other screens is changed into a small Chart and is highlighted (active).



59167D

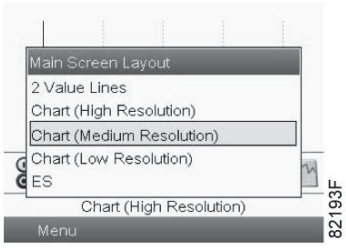
When the Chart (Medium Resolution) is selected, the chart shows the variation of the selected input per hour. The screen shows the last 4 hours.



When the Chart (Low Resolution) is selected, the chart shows the variation of the selected input per day. The screen shows the evolution over the last 10 days.

Selection of a main screen view

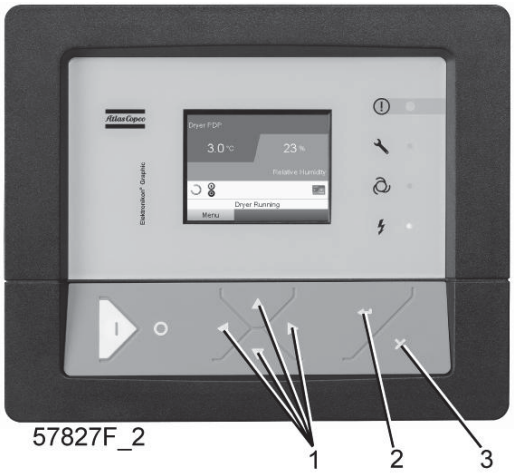
To change between the different screen layouts, select the far right icon in the control icons line (see value lines display icon or chart display icon in section Icons used) and press the Enter key. A screen similar to the one below opens:



Select the layout required and press the Enter key. See also section Inputs menu.

3.5 Calling up menus

Control panel

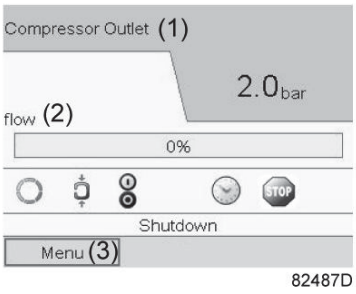


Control panel

(1)	Scroll keys
(2)	Enter key
(3)	Escape key

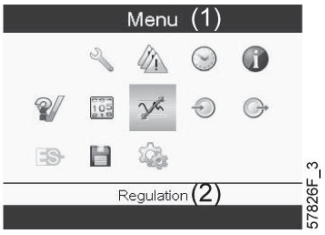
Description

When the voltage is switched on, the main screen is shown automatically (see section Main screen):



Typical Main screen (2 value lines)

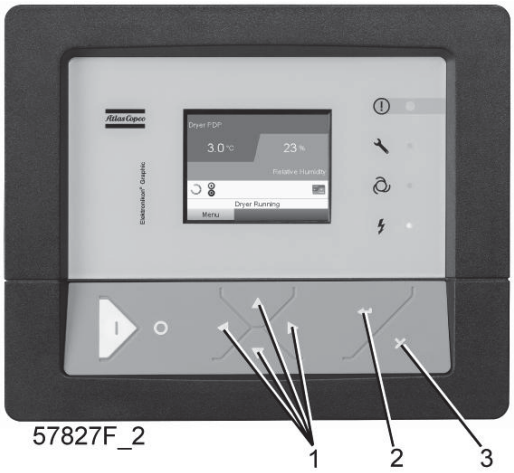
- To go to the Menu screen, select <Menu> (3), using the Scroll keys.
- Press the Enter key to select the menu. Following screen appears:



- The screen shows a number of icons. Each icon indicates a menu item. By default, the Pressure Settings (Regulation) icon is selected. The status bar shows the name of the menu that corresponds with the selected icon.
- Use the Scroll keys to select an icon.
- Press the Escape key to return to the Main screen.

3.6 Inputs menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Inputs



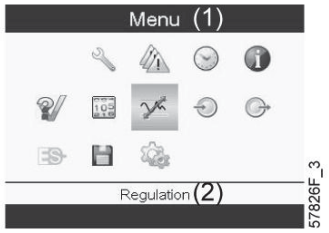
Function

- To display the actual value of the measured data (analog inputs) and the status of the digital inputs (e.g. emergency stop contact, motor overload relay, etc.).
- To select the digital input to be shown on the chart in the main screen.

Procedure

Starting from the main screen,

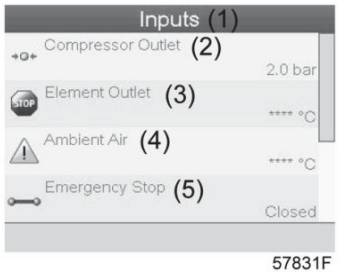
- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



Text on image

(1)	Menu
(2)	Regulation

- Using the Scroll keys, move the cursor to the Inputs icon (see above, section Menu icon).
- Press the Enter key. A screen similar to the one below appears:



Text on image

(1)	Inputs
(2)	Compressor outlet
(3)	Element outlet
(4)	Ambient air
(5)	Emergency stop

- The screen shows a list of all inputs with their corresponding icons and readings.
- If an input is in warning or shutdown, the original icon is replaced by the warning or shutdown icon respectively (i.e. the Stop icon and the Warning icon in the screen shown above).

A small chart icon, shown below an item in the list means this input signal is shown on the chart at the main screen. Any analog input can be selected.

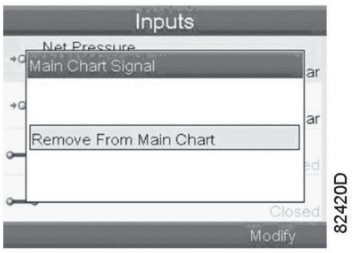
Selecting another input signal as main chart signal

With the Modify button active (light grey background in above screen), press the Enter button on the controller. A screen similar to the one below appears:



The first item in the list is highlighted. In this example, the Net Pressure is selected (chart icon).

To change, press the Enter button again: a pop-up window opens:



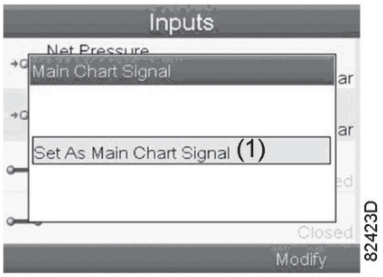
Press Enter again to remove this input from the chart. Another confirmation pop-up opens:



Select Yes to remove or No to quit the current action.

In a similar way, another input signal can be highlighted and selected as Main Chart signal:

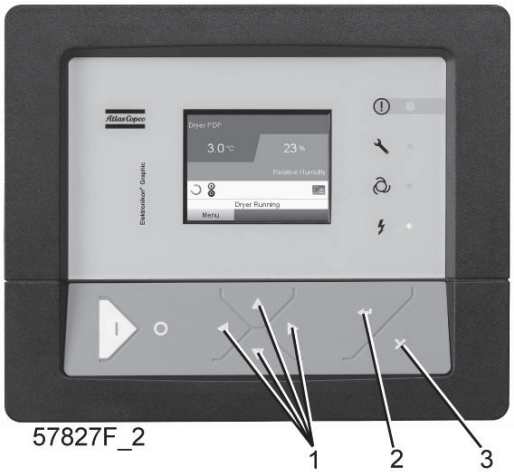




(1): Set as main chart signal

3.7 Outputs menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Outputs



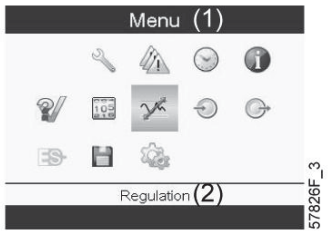
Function

To call up information regarding the actual status of some outputs such as the condition of the Fan overload contact (on air cooled compressors), the Emergency stop contact, etc.

Procedure

Starting from the Main screen,

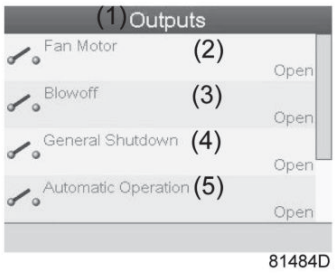
- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



Text on figure

(1)	Menu
(2)	Regulation

- Move the cursor to the Outputs icon (see above, section Menu icon, using the Scroll keys.
- Press the Enter key. A screen similar to the one below appears:



Outputs screen (typical)

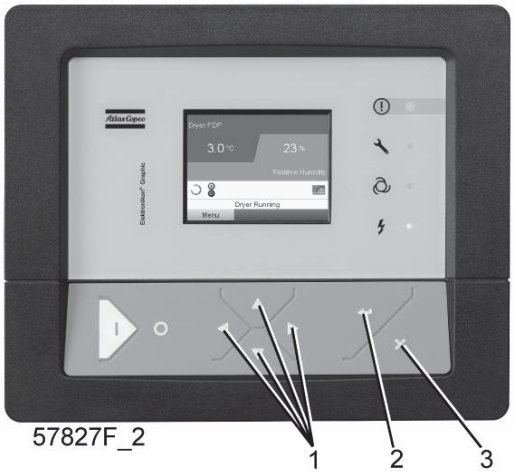
Text on image

(1)	Outputs
(2)	Fan motor contact
(3)	Blow-off contact
(4)	General shutdown
(5)	Automatic operation

- The screen shows a list of all outputs with their corresponding icons and readings.
 If an output is in warning or shutdown, the original icon is replaced by the warning or shutdown icon respectively.

3.8 Counters

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Counters



Function

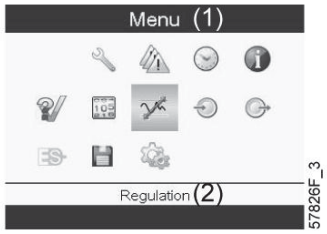
To call up:

- The running hours
- The loaded hours
- The number of motor starts
- The number of hours that the regulator has been powered
- The number of load cycles
- The number of recirculation cycles
- The number of recirculation cycle failures

Procedure

Starting from the Main screen (see Main screen),

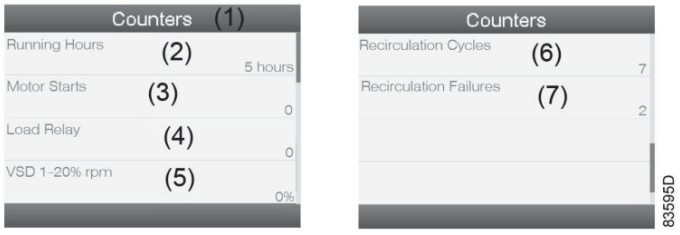
- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



Text on figure

(1)	Menu
(2)	Regulation

- Using the Scroll keys, move the cursor to the Counters icon (see above, section Menu icon)
- Press the Enter key. Following screen appears:



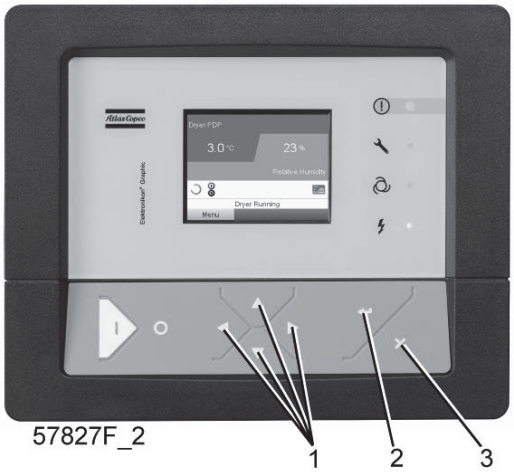
Text on figure

(1)	Counters
(2)	Running Hours
(3)	Motor Starts
(4)	Load Relay
(5)	VSD 1-20 % rpm in % (the percentage of the time during which the motor speed was between 1 and 20 %)
(6)	Recirculation Cycles
(7)	Recirculation Failures

The screen shows a list of all counters with their actual readings.

3.9 Control mode selection

Control panel



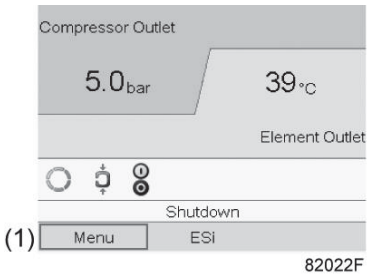
(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Function

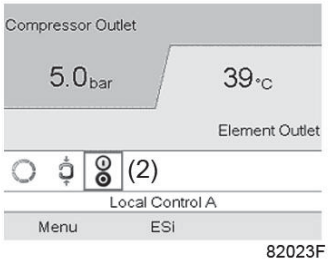
To select the control mode, i.e. whether the compressor is in local control, remote control or controlled via a local area network (LAN).

Procedure

Starting from the main screen, make sure the button Menu (1) is selected:

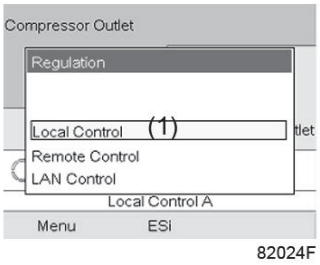


Next, use the scroll buttons to go to the regulation icon (2) and press the enter button:



There are 3 possibilities:

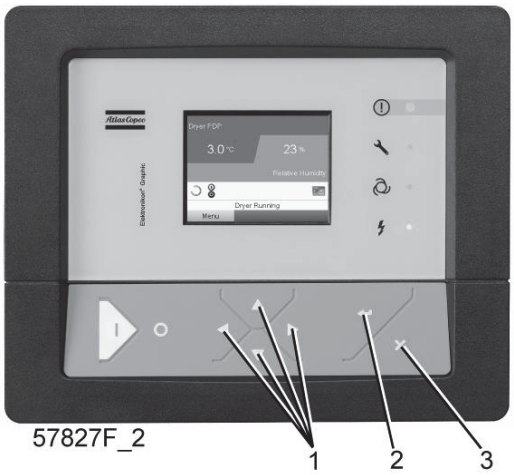
- Local control
- Remote control
- LAN (network) control



After selecting the required regulation mode, press the enter button on the controller to confirm your selection. The new setting is now visible on the main screen. See section Icons used for the meaning of the icons.

3.10 Service menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Service



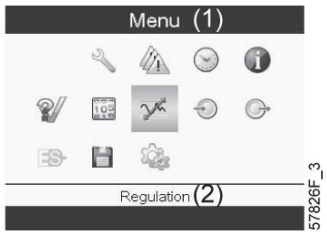
Function

- To reset the service plans which are carried out.
- To check when the next service plans are to be carried out.
- To find out which service plans were carried out in the past.
- To modify the programmed service intervals.

Procedure

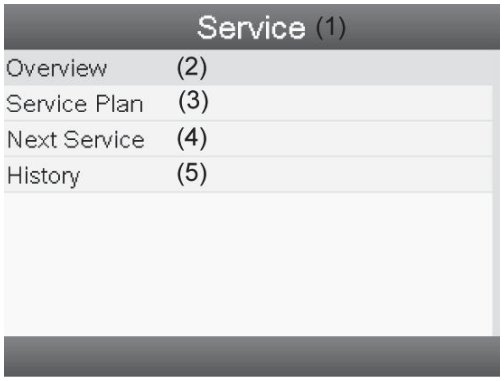
Starting from the Main screen,

- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- Using the Scroll keys, move the cursor to the Service icon (see above, section Menu icon).

- Press the Enter key. Following screen appears:



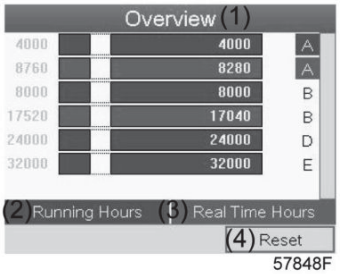
57847F_1

Text on image

(1)	Service
(2)	Overview
(3)	Service plan
(4)	Next service
(5)	History

- Scroll through the items to select the desired item and press the Enter key to see the details as explained below.

Overview



57848F

Text on image

(1)	Overview
(2)	Running Hours
(3)	Real Time hours
(4)	Reset

Example for service level (A):

The figures at the left are the programmed service intervals. For Service interval A, the programmed number of running hours is 4000 hours (upper row) and the programmed number of real time hours is 8760 hours, which corresponds to one year (second row). This means that the controller will launch a service warning when either 4000 running hours or 8760 real hours are reached, whichever comes first. Note that the real time hours counter keeps counting, also when the controller is not powered.

The figures within the bars are the number of hours to go till the next service intervention. In the example above, the compressor was just started up, which means it still has 4000 running hours or 8280 hours to go before the next Service intervention.

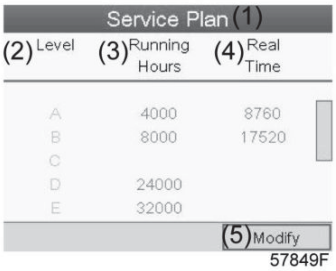
Service plans

A number of service operations are grouped (called Level A, Level B, etc...). Each level stands for a number of service actions to be carried out at the time intervals programmed in the Elektronikon® controller.

When a service plan interval is reached, a message will appear on the screen.

After carrying out the service actions related to the indicated levels, the timers must be reset.

From the Service menu above, select Service plan (3) and press Enter. Following screen appears:

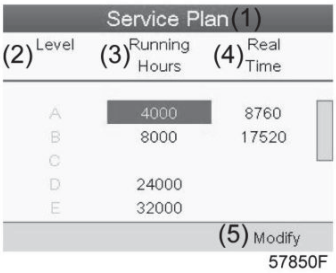


Text on image

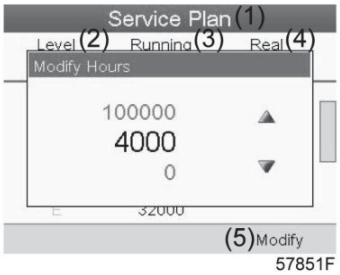
(1)	Service plan
(2)	Level
(3)	Running hours
(4)	Real time hours
(5)	Modify

Modifying a service plan

Dependant on the operating conditions, it can be necessary to modify the service intervals. To do so, use the Scroll keys to select the value to be modified. A screen similar to the one below appears:



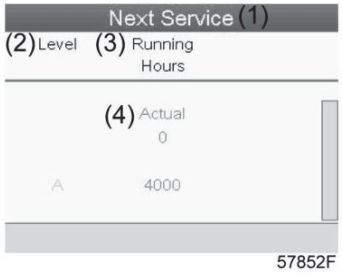
Press the Enter key. Following screen appears:



Modify the value as required using the ↑ or ↓ scroll key and press the Enter key to confirm.

Note: Running hours can be modified in steps of 100 hours, real time hours can be modified in steps of 1 hour.

Next Service



Text on image

(1)	Next service
(2)	Level
(3)	Running hours
(4)	Actual

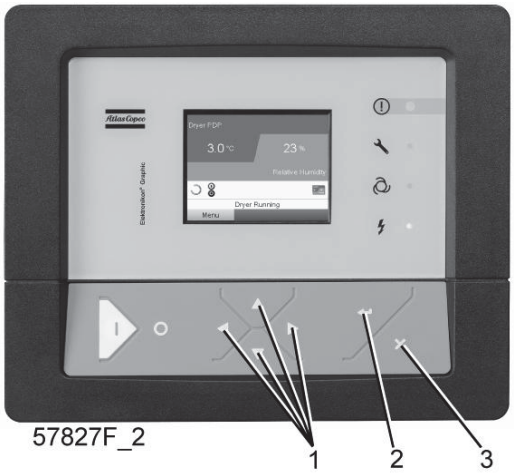
In the example above, the A Service level is programmed at 4000 running hours, of which 0 hours have passed.

History

The History screen shows a list of all service actions done in the past, sorted by date. The date at the top is the most recent service action. To see the details of a completed service action (e.g. Service level, Running hours or Real time hours), use the Scroll keys to select the desired action and press the Enter key.

3.11 Modifying the setpoint

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Setpoint



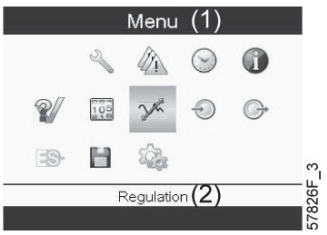
Function

On compressors with a frequency converter driven main motor, it is possible to program two different setpoints. This menu is also used to select the active setpoint.

Procedure

Starting from the Main screen,

- Highlight the action key Menu using the Scroll keys and press the Enter key. Following screen appears:



Text on image

(1)	Menu
(2)	Regulation

- Activate the menu by pressing the enter key. A screen similar to the one below appears:

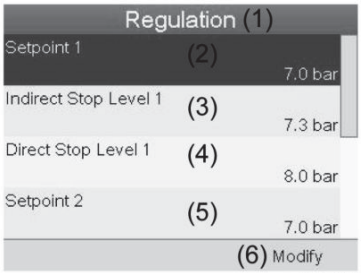


57828F

Text on image

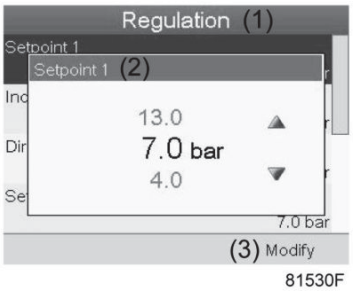
(1)	Regulation
(2)	Setpoint 1
(3)	Indirect stop level 1
(4)	Direct stop level 1
(5)	Setpoint 2
(6)	Modify

- The screen shows the actual settings.
 To modify the settings, move the cursor to the action button Modify and press the Enter key. Following screen appears:



57829F

- The first line of the screen is highlighted. Use the Scroll keys (1) to highlight the setting to be modified and press the Enter key (2). Following screen appears:



81530F

 The upper and lower limit of the setting is shown in grey, the actual setting is shown in black. Use the ↑ or ↓ key of the Scroll keys to modify the settings as required and press the Enter key to accept.

If necessary, change the other settings as required in the same way as described above.

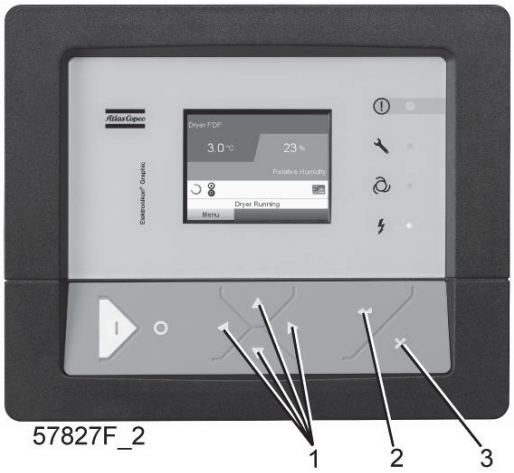
Indirect stop: occurs when the pressure rises to the pre-set Indirect stop setpoint (= setpoint plus Indirect stop level). The motor will decelerate to minimum speed and the compressor will switch to unloaded condition.

Direct stop: occurs when the compressor runs at a speed between minimum and maximum and the net pressure rises above the direct stop setpoint (= setpoint plus Direct stop level).

Both settings (Indirect stop level and Direct stop level) are programmable, see section Programmable settings.

3.12 Event history menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Event History



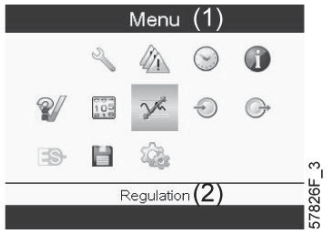
Function

To call up the last shut-down and last emergency stop data.

Procedure

Starting from the Main screen,

- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- Using the Scroll keys, move the cursor to the Event History icon (see above, section Menu icon)
- The list of last shut-down and emergency stop cases is shown.

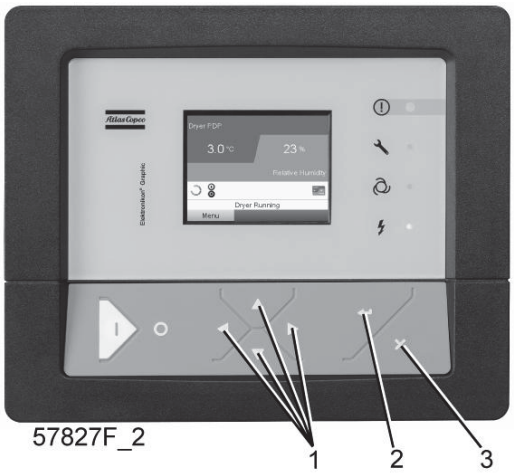


Example of Event History screen

- Scroll through the items to select the desired shut-down or emergency stop event.
- Press the Enter key to find the date, time and other data reflecting the status of the compressor when that shut-down or emergency stop occurred.

3.13 Modifying general settings

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Settings



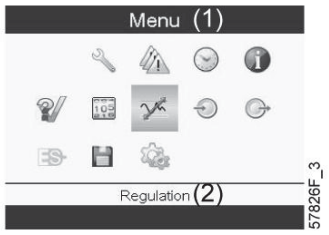
Function

To display and modify a number of settings.

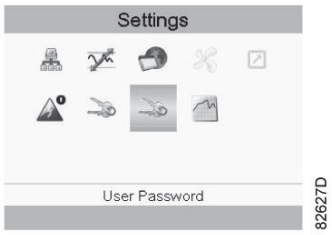
Procedure

Starting from the Main screen,

- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



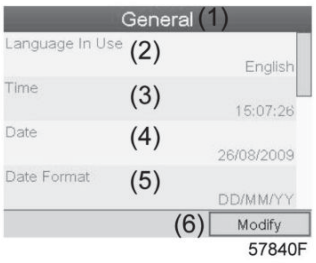
- Next, move the cursor to the Settings icon (see above, section menu icon).using the Scroll keys.
- Press the Enter key. Following screen appears:



This screen shows again a number of icons. By default, the User Password icon is selected. The status bar shows the description that corresponds with the selected icon. Each icon covers one or more items , such as

- Access level
- Elements
- Dryer
- Fan
- Converter(s)
- Filter(s)
- Motor/Starter
- General
- Automatic restart after voltage failure (ARAF)
- Network
- Regulation
- Remote

For adapting certain parameters, a password may be necessary.
Example: Selecting the General Settings icon gives the possibility to change e.g. the language, the date, the date format, etc.:



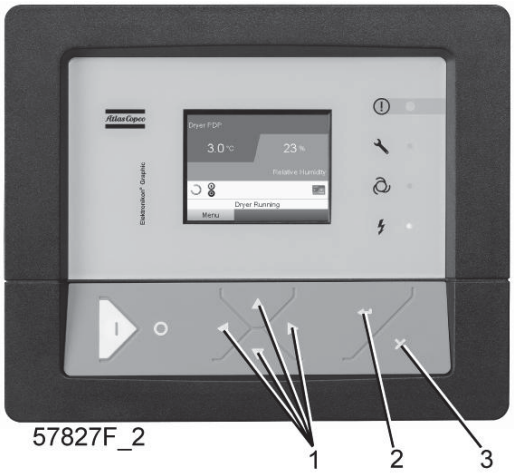
Text on image

(1)	General
(2)	Language used
(3)	Time
(4)	Date
(5)	Date format
(6)	Modify

- To modify, select the Modify button using the Scroll keys and press the Enter key.
- A screen similar to the one above is shown, the first item (Language) is highlighted. Use the ↓ key of the Scroll keys to select the setting to be modified and press the Enter key.
- A pop-up screen appears. Use the ↑ or ↓ key to select the required value and press the Enter key to confirm.

3.14 Info menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Info



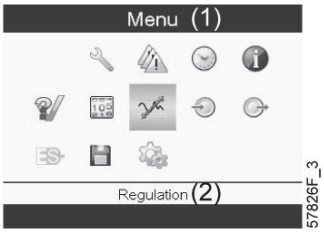
Function

To show the Atlas Copco internet address.

Procedure

Starting from the Main screen,

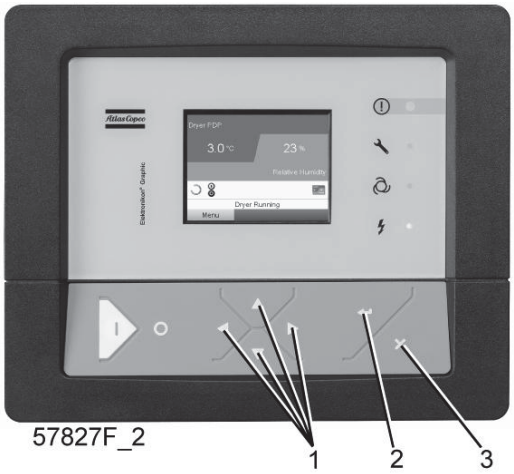
- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- Using the Scroll keys, move the cursor to the Info icon (see above, section Menu icon).
- Press the Enter key. The Atlas Copco internet address appears on the screen.

3.15 Week timer menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Week timer



Function

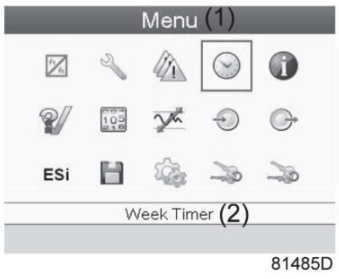
- To program time-based start/stop commands for the compressor
- To program time-based change-over commands for the net pressure band
- Four different week schemes can be programmed.
- A week cycle can be programmed, a week cycle is a sequence of 10 weeks. For each week in the cycle, one of the four programmed week schemes can be chosen.

	Important remark: In the Elektronikon you can select different timers on one day.(up to 8 actions). It is however not possible to program 2 actions at the same time. The solution: leave at least 1 minute in between 2 actions. Example: Start Compressor: 5.00 AM, Pressure Setpoint 2: 5.01 AM (or later).

Procedure

Starting from the Main screen (see Main screen),

- Move the cursor to the action button Menu and press the Enter key. Use the Scroll buttons to select the Timer icon.



Text on figure

(1)	Menu
(2)	Week Timer

- Press the Enter key on the controller. Following screen appears:

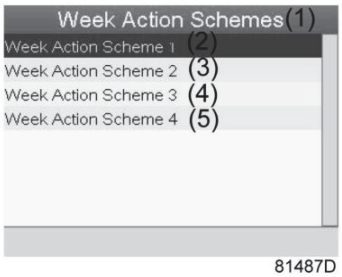


(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Week Timer Inactive
(6)	Remaining Running Time

The first item in this list is highlighted in red. Select the item requested and press the Enter key on the controller to modify.

Programming week schemes

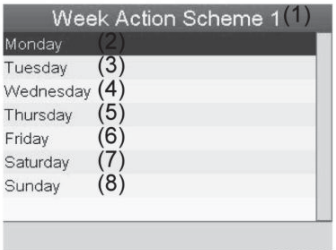
- Select Week action schemes and press Enter. A new window opens. The first item in the list is highlighted in red. Press the Enter key on the controller to modify Week Action Scheme 1.



81487D

(1)	Week Action Schemes
(2)	Week Action Scheme 1
(3)	Week Action Scheme 2
(4)	Week Action Scheme 3
(5)	Week Action Scheme 4

- A weekly list is shown. Monday is automatically selected and highlighted in red. Press the Enter key on the controller to set an action for this day.

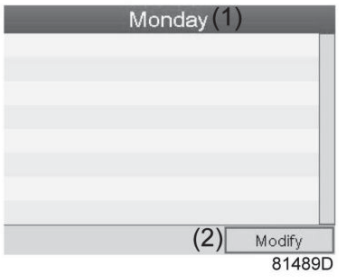


81488D

(1)	Week Action Scheme 1
(2)	Monday
(3)	Tuesday
(4)	Wednesday
(5)	Thursday

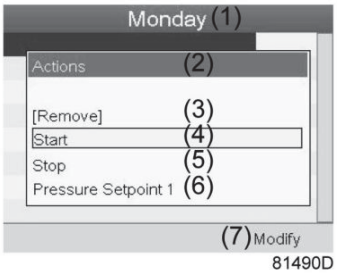
(6)	Friday
(7)	Saturday
(8)	Sunday

- A new window opens. The Modify action button is selected. Press the enter button on the controller to create an action.



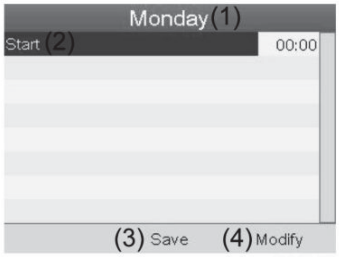
(1)	Monday
(2)	Modify

- A new pop-up window opens. Select an action from this list by using the Scroll keys on the controller. When ready press the Enter key to confirm.



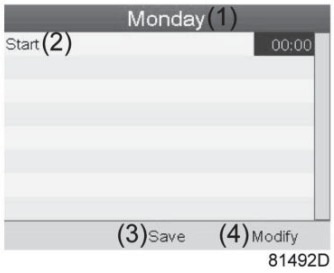
(1)	Monday
(2)	Actions
(3)	Remove
(4)	Start
(5)	Stop
(6)	Pressure Setpoint 1
(7)	Modify

- A new window opens. The action is now visible in the first day of the week.



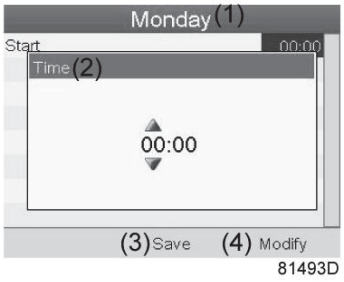
(1)	Monday
(2)	Start
(3)	Save
(4)	Modify

- To adjust the time, use the Scroll keys on the controller and press the Enter key to confirm.



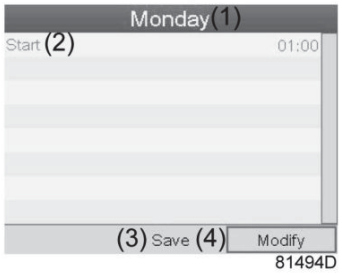
(1)	Monday
(2)	Start
(3)	Save
(4)	Modify

- A pop-up window opens. Use the ↑ or ↓ key of Scroll keys to modify the values of the hours. Use the ← or → Scroll keys to go to the minutes.



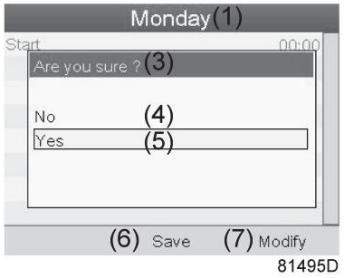
(1)	Monday
(2)	Time
(3)	Save
(4)	Modify

- Press the Escape key on the controller. The action button Modify is selected. Use the Scroll keys to select the action Save.



(1)	Monday
(2)	Start
(3)	Save
(4)	Modify

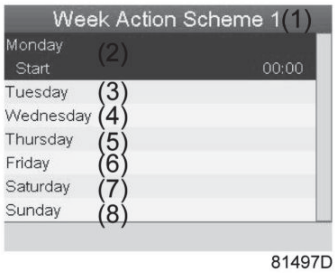
- A new pop-up window opens. Use the Scroll keys on the controller to select the correct actions. Press the Enter key to confirm.



(1)	Monday
(3)	Are you sure?
(4)	No
(5)	Yes
(6)	Save
(7)	Modify

Press the Escape key to leave this window.

- The action is shown below the day the action is planned.



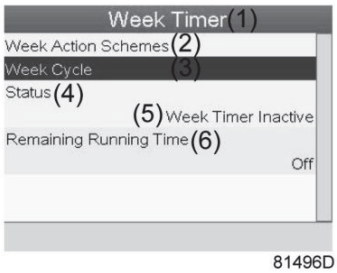
(1)	Week Action Scheme 1
(2)	Monday - Start
(3)	Tuesday
(4)	Wednesday
(5)	Thursday
(6)	Friday
(7)	Saturday
(8)	Sunday

Press the Escape key on the controller to leave this screen.

Programming the week cycle

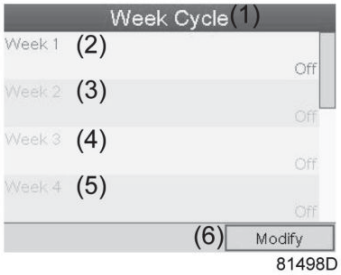
A week cycle is a sequence of 10 weeks. For each week in the cycle, one of the four programmed week schemes can be chosen.

- Select Week Cycle from the main Week Timer menu list.



(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Week Timer Inactive
(6)	Remaining Running Time

- A list of 10 weeks is shown.

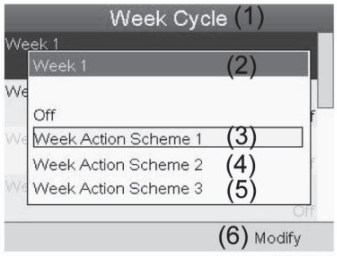


(1)	Week Cycle
(2)	Week 1

(3)	Week 2
(4)	Week 3
(5)	Week 4
(6)	Modify

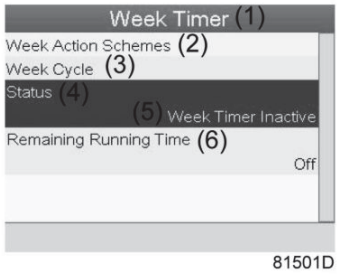
Press twice the Enter key on the controller to modify the first week.

- A new window opens. Select the action, example: Week Action Scheme 1



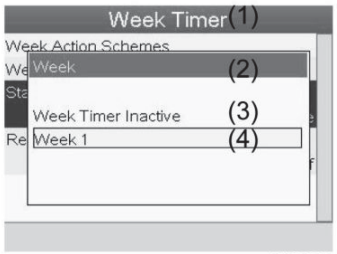
(1)	Week Cycle
(2)	Week 1
(3)	Week Action Scheme 1
(4)	Week Action Scheme 2
(5)	Week Action Scheme 3
(6)	Modify

- Check the status of the Week Timer
 Use the Escape key on the controller to go back to the main Week Timer menu. Select the status of the Week Timer.



(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Week Timer Inactive
(6)	Remaining Running Time

- A new window opens. Select Week 1 to set the Week Timer active.



81502D

(1)	Week Timer
(2)	Week
(3)	Week Timer Inactive
(4)	Week 1

- Press the Escape key on the controller to leave this window. The status shows that week 1 is active.



81503D

(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Remaining Running Time

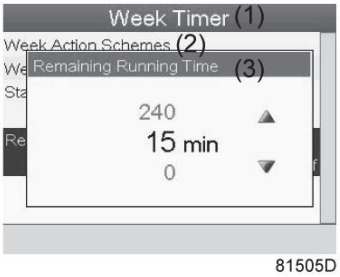
- Press the Escape key on the controller to go to the main Week Timer menu. Select Remaining Running Time from the list and press the Enter key on the controller to Modify.



81504D

(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Remaining Running Time

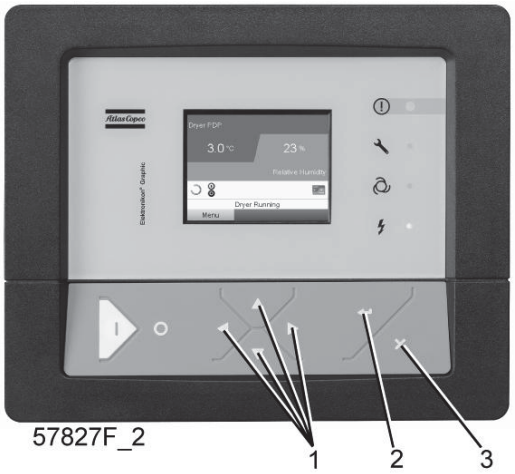
- This timer is used when the week timer is set and for certain reasons the compressor must continue working, for example, 1 hour, it can be set in this screen. This timer is prior to the Week Timer action.



(1)	Week Timer
(2)	Week action schemes
(3)	Remaining Running Time

3.16 Test menu

Control panel



Menu icon, Test



or



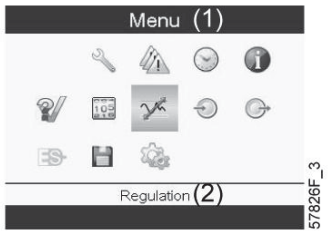
Function

- To carry out a display test, i.e. to check whether the display and LEDs are still intact.

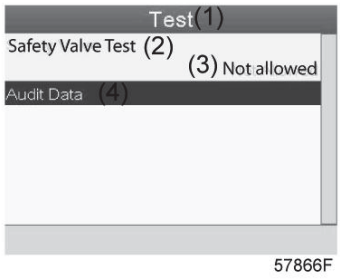
Procedure

Starting from the Main screen,

- Move the cursor to the action button Menu and press the enter key (2), following screen appears:



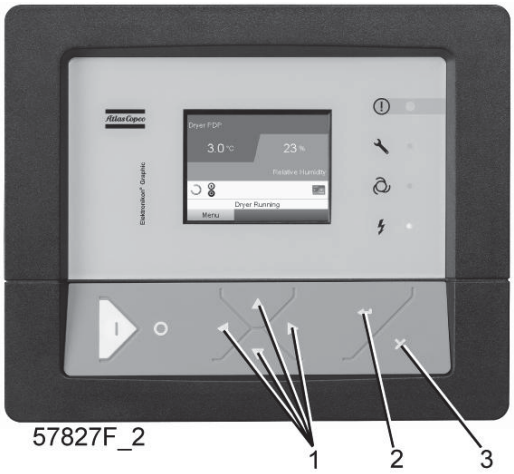
- Using the scroll keys (1), move the cursor to the test icon (see above, section Menu icon)
- Press the enter key (2), following screen appears:



- The safety valve test can only be performed by authorized personnel and is protected by a security code.
- Select the item display test and press the enter key. A screen is shown to inspect the display, at the same time all LED's are lit.

3.17 User password menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Password



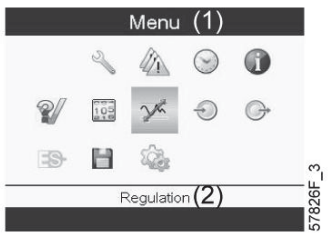
Function

If the password option is activated, it is impossible for not authorized persons to modify any setting.

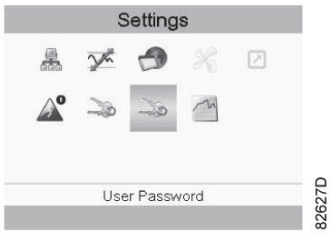
Procedure

Starting from the Main screen (see Main screen),

- Move the cursor to <Menu> and press the Enter key (2). Following screen appears:



- Using the Scroll keys, select the <Settings> icon (see section Modifying general settings)
- Press the Enter key. Following screen appears:



- Move the cursor to the Password icon (see above, section Menu icon)
- Select <Modify> using the Scroll keys and press the Enter key. Next, modify the password as required.

3.18 Web server

All Elektronikon controllers have a built-in web server that allows direct connection to the company network or to a dedicated PC via a local area network (LAN). This allows to consult certain data and settings via a PC instead of the display of the controller.

Getting started

	If the compressor is equipped with a **SMART**BOX, the network connection of the Elektronikon is already in use. To allow the web server functionality, the network cable that is connected to the **SMART**BOX should be unplugged and replaced by the cable of the company network. If both the web server functionality and **SMART**BOX are required, please contact your local Atlas Copco Customer Centre for support.

Make sure you are logged in as administrator.

- Use the internal network card from your computer or a USB to LAN adapter (see picture below).



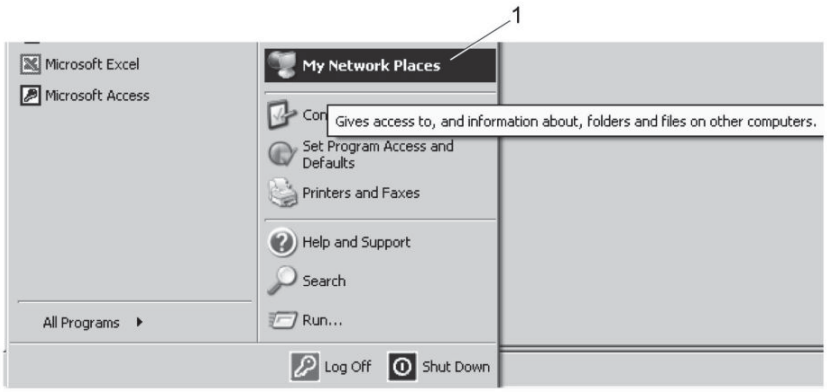
USB to LAN adapter

- Use a UTP cable (CAT 5e) to connect to the controller (see picture below).



Configuration of the network card (in Windows XP)

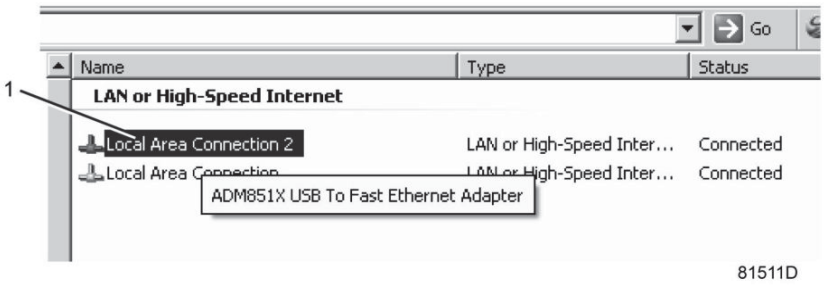
- Go to My Network places (1).



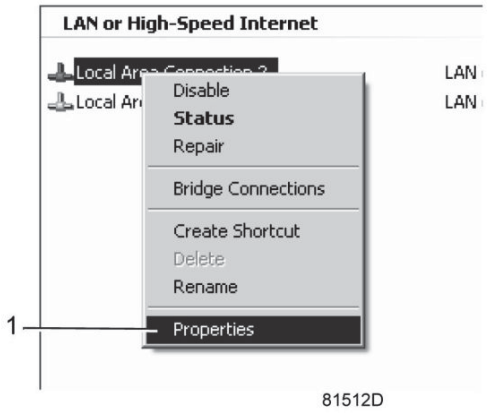
- Click on View Network connections (1).



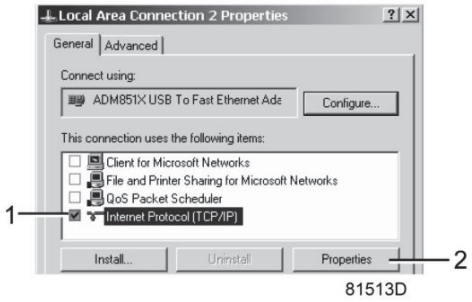
- Select the Local Area connection (1), which is connected to the controller.



- Click with the right button and select properties (1).



- Use the check box Internet Protocol (TCP/IP) (1) (see picture). To avoid conflicts, uncheck other properties if they are checked. After selecting TCP/IP, click on the Properties button (2) to change the settings.



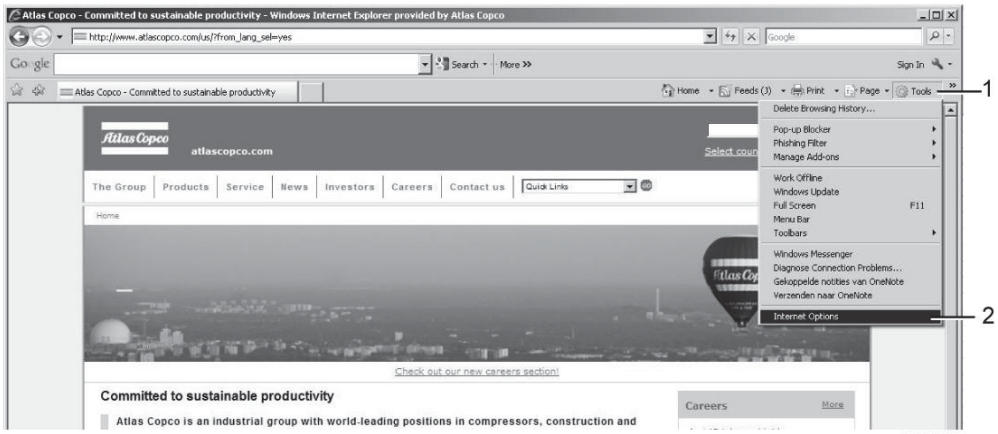
- Use the following settings:
 - IP Address 192.168.100.200
 - Subnetmask 255.255.255.0

 Click OK and close network connections.

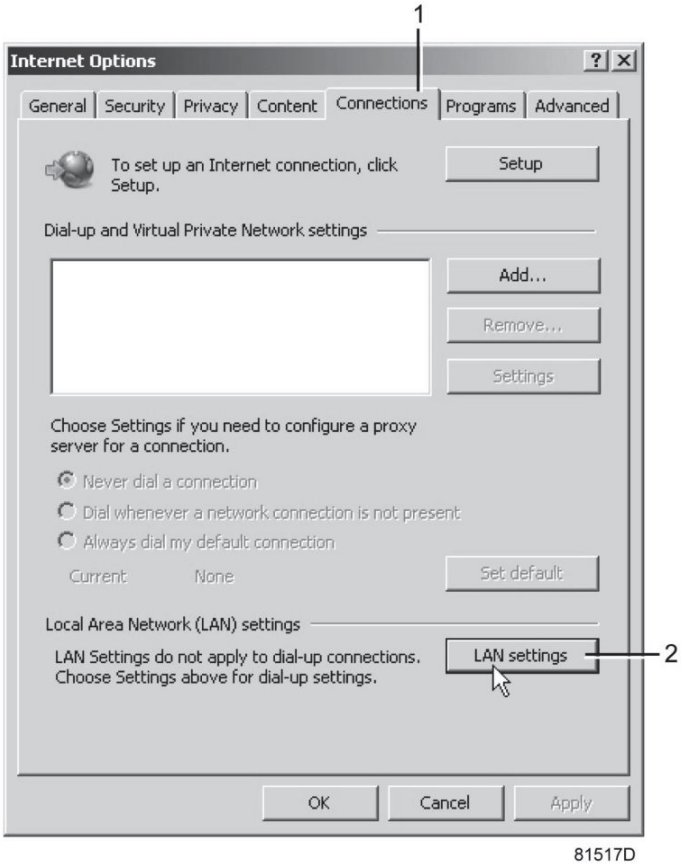
Configuration of the web server

Configure the web interface (for Internet Explorer)

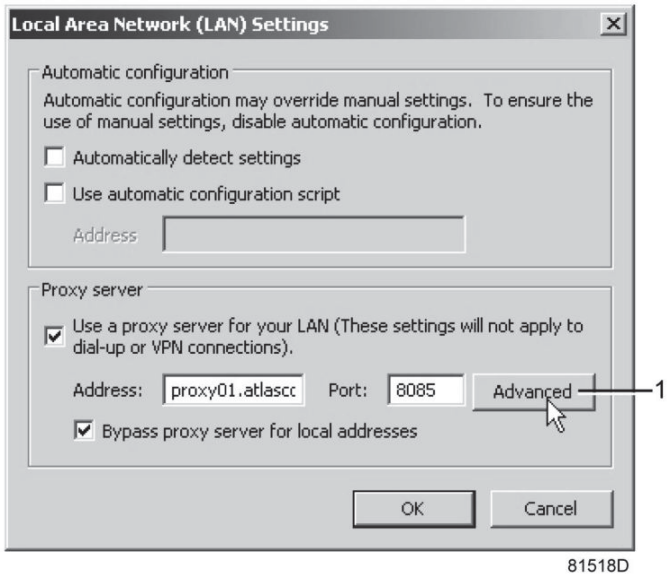
- Open Internet Explorer and click on Tools - Internet options (2).



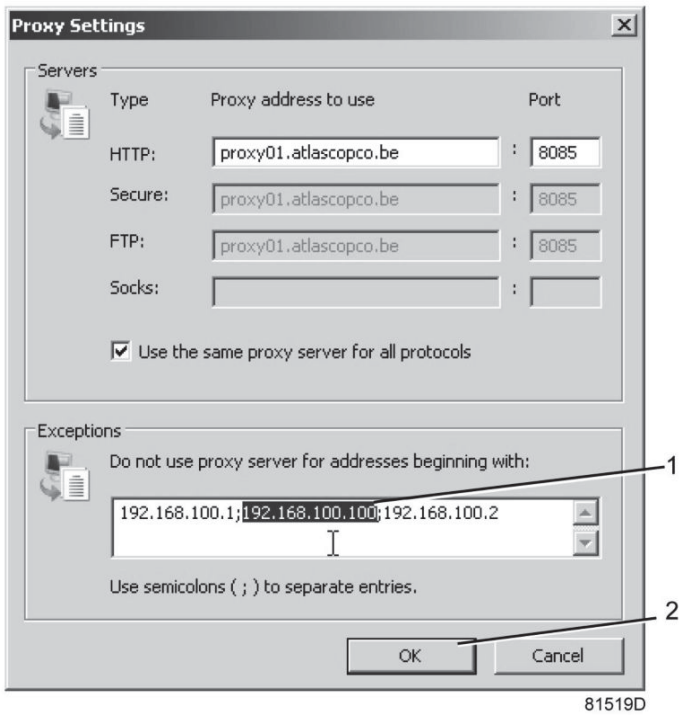
- Click on the Connections tab (1) and then click on the LAN settings button (2).



- In the Proxy server Group box, click on the Advanced button (1).



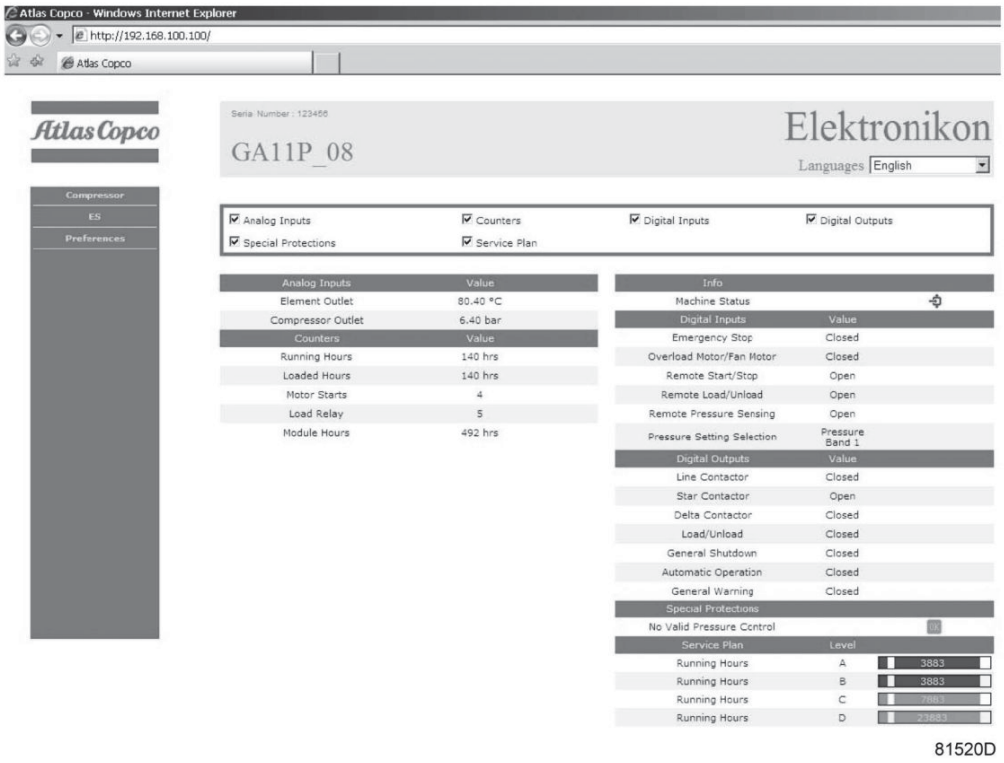
- In the Exceptions Group box, enter the IP address of your controller. Multiple IP addresses can be given but they must be separated with semicolons (;).
 Example: Suppose that you already added two IP addresses (192.168.100.1 and 192.168.100.2). Now you add 192.168.100.100 and separate the 3 IP addresses by putting semicolons between them (1) (see picture). Click OK (2) to close the window.



Viewing the controller data

	All screen shots are indicative. The number of displayed fields depends on the selected options.

- Open your browser and type the IP address of the controller you want to view in your browser (in this example http://192.168.100.100). The interface opens:



Screen shot (example!)

Navigation and options

- The banner shows the compressor type and the language selector. In this example, three languages are available on the controller.

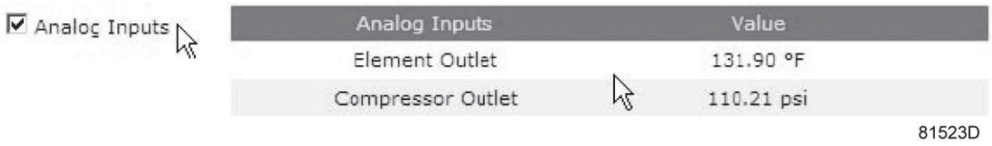


Compressor settings

All compressor settings can be displayed or hidden. Put a check mark in front of each point of interest and it will be displayed. Only the machine status is fixed and can not be removed from the main screen.

Analog inputs

Lists all current analog input values. The measurement units can be changed in the preference button from the navigation menu.



81523D

Counters

Lists all current counter values from controller and compressor.



81524D

Info status

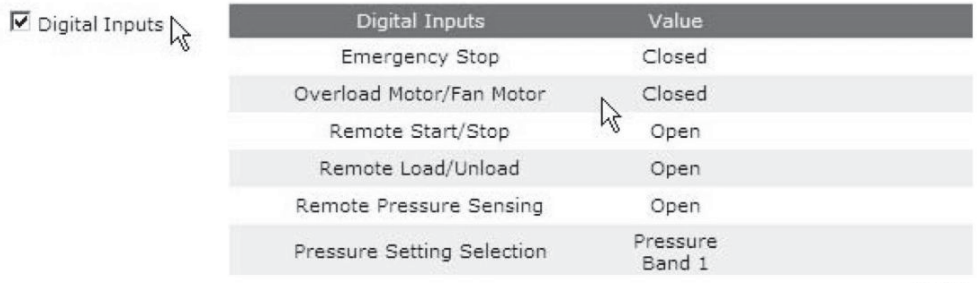
Machine status is always shown on the web interface.



81525D

Digital inputs

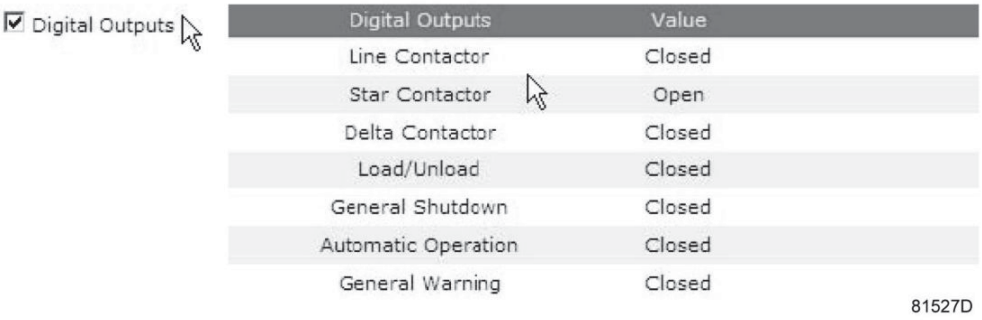
Lists all Digital inputs and their status.



81526D

Digital outputs

Lists all Digital outputs and their status.



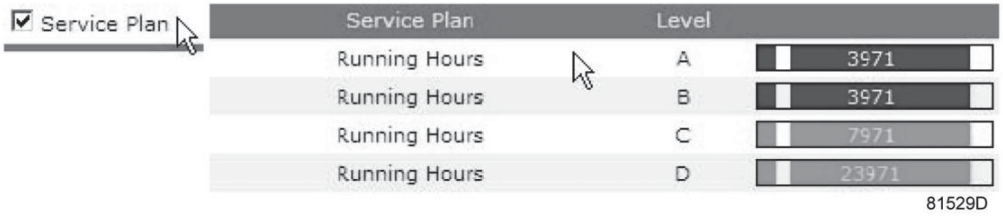
Special protections

Lists all special protections of the compressor.



Service plan

Displays all levels of the service plan and their status. This screen shot underneath only shows the running hours. It is also possible to show the current status of the service interval.



3.19 Programmable settings

Compressor/motor

		Minimum setting	Factory setting	Maximum setting
Set-point 1 and 2, Workplace compressors	bar(e)	4	7	13
Set-point 1 and 2, Workplace compressors	psig	58	100	188
Set-point 1 and 2, Workplace Full-Feature compressors	bar(e)	4	6.8	12.8
Set-point 1 and 2, Workplace Full-Feature compressors	psig	58	99	186
Indirect stop level	bar	0.1	0.3	1
Indirect stop level	psi	1.45	4.35	14.5
Direct stop level	bar	0.3	1	1.5
Direct stop level	psi	4.35	14.5	21.8

		Minimum setting	Factory setting	Maximum setting
Proportional band	%	6	10	15
Integration time	sec	5	6	10

Parameters

		Minimum setting	Factory setting	Maximum setting
Minimum stop time	sec	5	5	30
Power recovery time	sec	10	10	3600
Restart delay	sec	0	0	1200
Communication time-out	sec	10	30	60
Fan motor starts per day (air-cooled compressors)		1	240	240

Protections

		Minimum setting	Factory setting	Maximum setting
Compressor element outlet temperature (shut-down warning level)	˚C	50	110	119
Compressor element outlet temperature (shut-down warning level)	˚F	122	230	246
Compressor element outlet temperature (shut-down level)	˚C	111	120	120
Compressor element outlet temperature (shut-down level)	˚F	232	248	248

Specific protections for Full-Feature compressors:

		Minimum setting	Factory setting	Maximum setting
Dewpoint warning temperature	ºC		25	99
Dewpoint warning temperature	ºF		77	210

Specific protections for water cooled compressors

		Minimum setting	Factory setting	Maximum setting
Cooling water inlet temperature (warning level)	˚C	0	50	99
Cooling water inlet temperature (warning level)	˚F	32	122	210
Cooling water outlet temperature (warning level)	˚C	0	60	99
Cooling water outlet temperature (warning level)	˚F	32	140	210

Service plan

The built-in service timers will give a Service warning message after their respective preprogrammed time interval has elapsed.

For specific data, see section Preventive Maintenance.

Consult Atlas Copco if a timer setting needs to be changed. The intervals must not exceed the nominal intervals and must coincide logically. See section Modifying general settings.

Terminology

Term	Explanation
ARAVF	Automatic Restart After Voltage Failure. See section Elektronikon regulator.
Power recovery time	Is the period within which the voltage must be restored to have an automatic restart. Is accessible if the automatic restart is activated. To activate the automatic restart function, consult Atlas Copco.
Restart delay	This parameter allows to programme that not all compressors are restarted at the same time after a power failure (ARAVF active).
Compressor element outlet	The recommended minimum setting is 70 ˚C (158 ˚F). For testing the temperature sensor the setting can be decreased to 50 ˚C (122 ˚F). Reset the value after testing. The regulator does not accept inconsistent settings, e.g. if the warning level is programmed at 95 ˚C (203 ˚F), the minimum limit for the shut-down level changes to 96 ˚C (204 ˚F). The recommended difference between the warning level and shut-down level is 10 ˚C (18 ˚F).
Delay at signal	Is the time period during which the warning signal must exist before the warning message appears.
Delay at start	Is the time period after starting which must expire before generating a warning. The setting should be less than the setting for the delay at signal.
Minimum stop time	Once the compressor has automatically stopped, it will remain stopped for the minimum stop time, whatever happens with the net air pressure.
Proportional band and integration time	The settings for the Proportional band and integration time are determined by experiment. Altering these settings may damage the compressor. Consult Atlas Copco.

4 SMARTBOX and SMARTLINK

SMARTBOX

The machine is equipped with a **SMART**BOX mounted in the electrical cabinet.



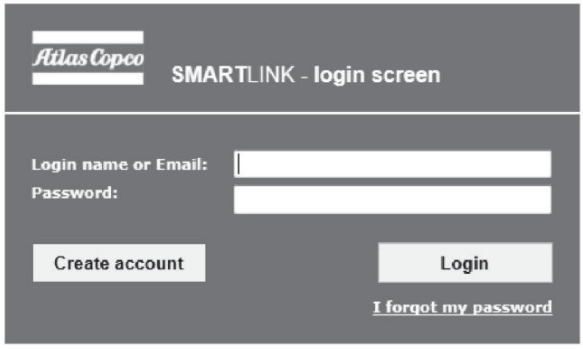
59850F

The **SMART**BOX allows read-out of a number of parameters of the machine on a user login-protected web site called **SMART**LINK. The connected antenna is mounted on the outside of the machine.

SMARTLINK

In case **SMART**LINK access is desired, at least one machine SMARTLINK-ready machine is required. Follow the next steps:

- Take the information about the **SMART**LINK-ready machine(s) (e.g. picture of the data plate; invoice, …)
- Go to the **SMART**LINK web site http://www.atlascopco.com/smartlink
- Click on the left button in the screen below.



59851F

- Use the data of the **SMART**LINK–ready machine to register as a user.



59852F

- You will receive an e-mail with login credentials.
- Go to the **SMART**LINK web site http://www.atlascopco.com/smartlink, log in with the user credentials.
- Enjoy **SMART**LINK!
- In case more **SMART**LINK-ready machines are available, you can add these via *My Profile*.

5 OSCi (optional)

5.1 Introduction

Compressed air produced by oil-injected compressors contains a small quantity of oil. During the cooling of the air in the aftercooler and in the refrigeration dryer (on compressors with built-in refrigeration dryer), oil-containing condensate is formed.

The OSCi is a condensate treatment device, designed to separate most of this oil from the water and to sorb it in its replaceable filters, thus preventing contamination of the environment. It is capable to break and sorb most stable emulsions. The OSCi is insensitive to shocks and vibrations because of the use of filters and can be used with all types of drains. The condensate meets the requirements of the environmental codes.

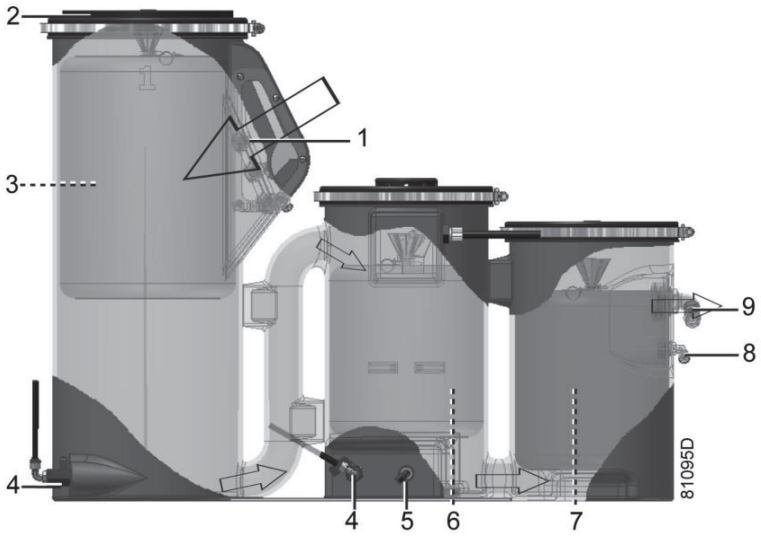
The OSCi is installed inside a separate box, hinged to the compressor canopy.



OSCi inside the box on a GA compressor

5.2 Operation

General



Condensate flow scheme

1	Condensate inlet
2	Foam cover
3	Oleophilic filter
4	Service drains with valve
5	Air injection connection
6	OGC filter
7	Activated carbon filter
8	Condensate test outlet
9	Condensate outlet

The OSCi 3790 housing consists of 3 interconnected vessels. The oil-containing condensate is injected (1) in discontinuous bursts at a downward angle into the first vessel which acts as expansion chamber. The specially designed cover has a combination of pressure-relieving holes and a foam (2). Since the pressure is relieved here, the entire OSCi device is pressureless. In the first vessel, a floating filter (3) made of special synthetic fibres takes up most of the directly separable hydrocarbons from the condensate. The filter sinks as it saturates with hydrocarbons and hence the lifetime progress of the filter can be measured by an indicator that rests on the bag. A conventional sight glass is installed for visual inspection of the filter position and the condensate level. On top of that, an electronic position sensor (8 - View of OSCi, 1 - View of OSCi inlet) is connected to the Elektronikon® Graphic regulator of the compressor to keep track of the filter lifetime without the need to open the compressor canopy.

The outlet of the first vessel is situated at the bottom and is connected to the upper half of the second vessel. In the second vessel, the pre-filtered condensate is brought in contact with a filter bag (6), filled with oleophilic granular clay (OGC). Through a connection (5) at the bottom of the second vessel, air is injected into the

condensate. This airflow breaks stable emulsions by enhancing the sorption process of oil onto the OGC. The air supply also prevents the formation of certain anaerobic bacteria. Also the cover of the second vessel is equipped with ventilation holes to prevent pressure buildup. The airflow is taken from the aftercooler (on air cooled units) or from the water separator (WSD) (on water cooled units). An integrated nozzle with strainer limits the airflow (approximately 450 l/h at reference conditions), while a solenoid valve makes sure no compressed air is used when the compressor is not delivering air.

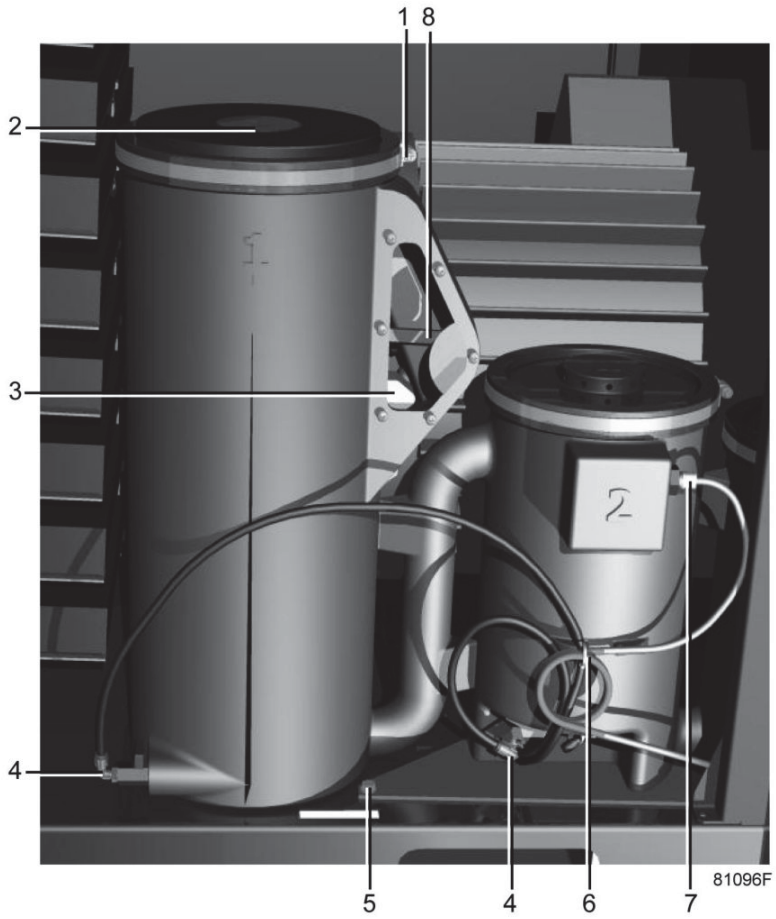
A level switch (7 - View of OSCi), connected to the Elektronikon® Graphic controller of the compressor monitors the condensate level in the second vessel. During normal operation this switch is in the closed position, so that any abnormality (a too high condensate level) opens the electric circuit and triggers the alarm, which is made visible on the Elektronikon® display (see section Warnings).

The condensate further flows to the third vessel, through a pipe connecting both lower halves of the vessels. An activated carbon filter (7) cleans the condensate further, and the clean condensate flows out of connection (9). A test outlet (8) is positioned below the normal outlet. Both outlets are connected to the compressor drain plate by their corresponding tubes.

At the bottom of the vessels, drain tubes with valves (4) are provided for easy servicing.

In this setup, the cleaning process can be understood by splitting it up per vessel:

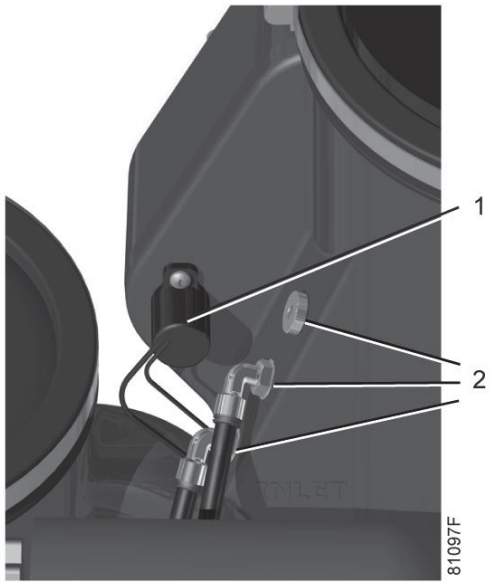
- First vessel: pre-separation and sorption of most of the free, directly separable oil
- Second vessel: emulsion separation and oil sorption
- Third vessel: sorption of the remaining oil



View of OSCi

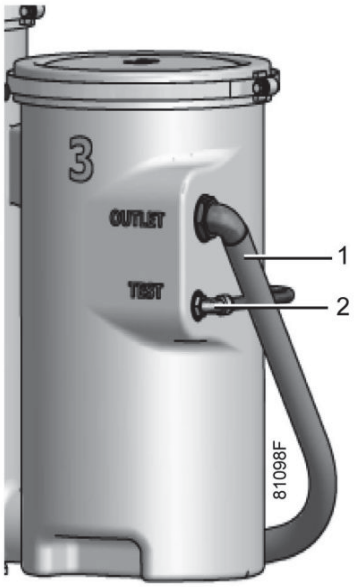
1	Clamping ring
2	Foam cover
3	Location of sample bottles and connection material (during shipping only)
4	Service drains with valve
5	Fixation bolts
6	Wire and tube clamp
7	Overflow switch
8	Filter position sensor and visual indication of the filter position

Detail views



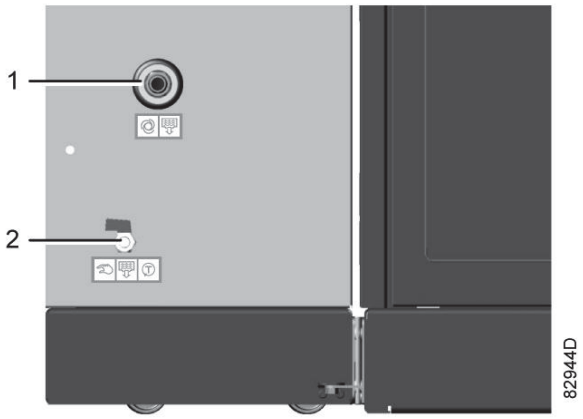
View of OSCi inlet

1	Filter position sensor
2	Condensate inlet connections



View of OSCi outlet

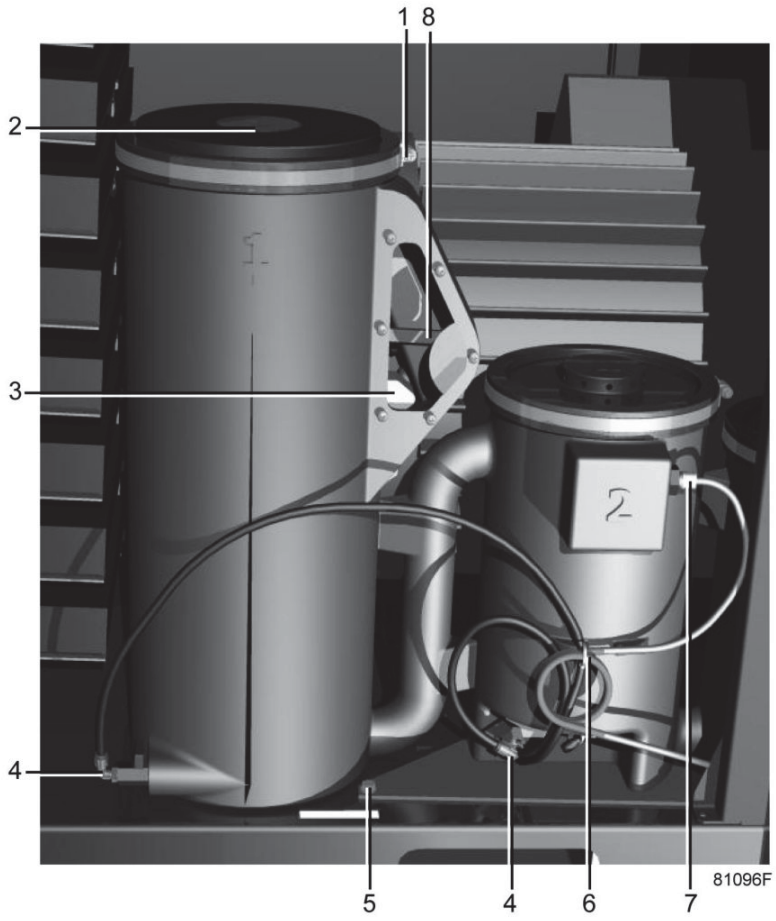
1	Condensate outlet
2	Condensate test outlet



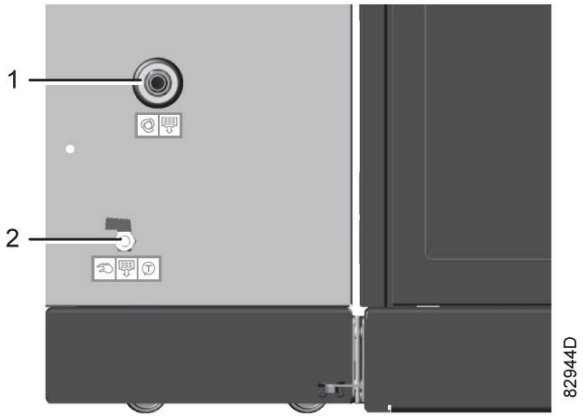
Drain plate

1	Condensate outlet connection of the OSCi
2	Condensate sample valve

5.3 Putting into operation (commissioning)



1. Verify that the OSCi drain valves (4) are closed.
2. Unscrew the clamping ring (1) of the cover of the first vessel of the OSCi and take off the cover (2).
3. Take out the CDROM and the box (3) with the test bottle and the reference bottle and keep them in a safe place nearby the compressor.
4. Take the ISO 7-R ½ connection and the G ¼ ball valve with seal and screw them into the corresponding threads in the drain plate at the backside of the external box (Drain plate). Close the condensate sample valve.

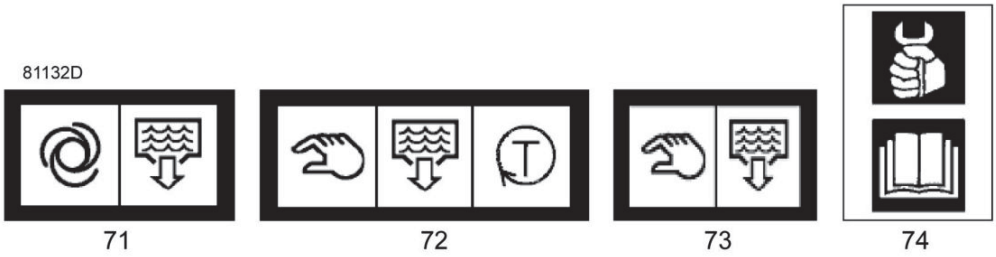


Drain plate

5. Connect an outlet tube leading to the sewage system (19 mm inner diameter). Since the OSCi functions at atmospheric pressure, the outlet piping must always be positioned below the outlet connection on the OSCi vessel 3, unless a pump (able to run dry) is installed (not provided).
6. Check that the filter in the first tower is of circular shape and that it can move freely up and down. Pour clean water along the inner edge of the first tower until water flows out of the outlet connection or until the water reaches the bottom of the sensor chamber (visible through the sight-glass). The oleophilic filter (vessel 1) will start to float. Verify that the sensor arm (8) is in the upward position and rests on the edge of the filter bag.
7. Check that there are no leaks at the connections between vessel 1, 2 and 3. If there is a leak, proceed to Problem solving, fault 3.
8. Put the cover back on the first tower, tighten the clamping ring and close the compressor bodywork.

	• All outlet tubes outside the compressor must be positioned below the outlet drain connection (drain plate) of the compressor, at least up to where a pump is installed. • Outlet piping must be installed with a slight downward slope to the sewer, unless a pump is installed.

5.4 Pictographs



71	Automatic condensate outlet (not pressurized!)
72	Periodically required manual test outlet
73	Manual condensate outlet
74	Consult manual before maintenance or repair

5.5 Elektronikon® display and warnings

Following important parameters of the OSCi can be consulted from the Elektronikon® display:

- The remaining filter lifetime, expressed as a percentage compared to new filters (100%)
- The status of the overflow switch

To consult these data, please follow the steps given in the following sections.

The OSCi is referenced by the Elektronikon® Graphic with the following symbol:

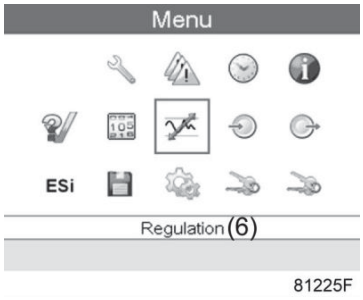


5.6 Data displayed during normal operation

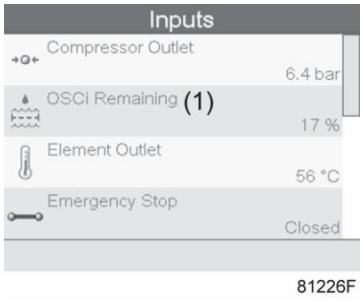
During normal operation, the main screen is displayed (see section Main screen).

From the main screen, select <Menu> and press the Enter key.

Following screen appears:

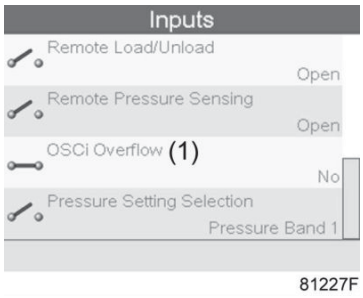


Press the right arrow and press enter to go into the Inputs submenu. The remaining lifetime of the OSCi filters, expressed as a percentage compared to the lifetime of new filters is displayed:



Reference	Description
(1)	OSCi filters remaining lifetime

To take a look at the status of the OSCi overflow sensor, press the down arrow a few times. “No” indicates that there is no overflow danger.

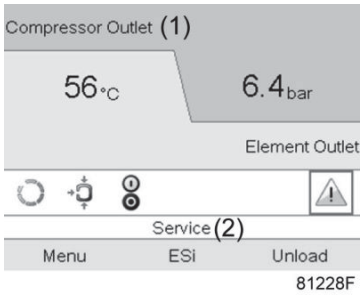


Reference	Description
(1)	OSCi overflow

5.7 Warnings

Service required

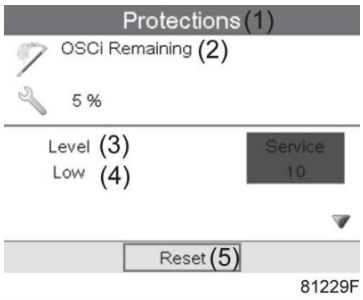
This warning indicates that the remaining filter lifetime has dropped below 10%. In this case a service kit with new filters needs to be ordered. The service LED at the right side of the Elektronikon® Graphic controller will light up. To consult the warning, navigate the cursor to the warning icon as on the following image.



Service required icon highlighted (example shown on a typical main screen of a fixed speed compressor)

Reference	Description
(1)	Compressor outlet
(2)	Service

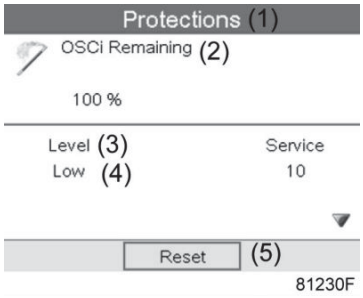
After pressing enter, the following screen with the remaining lifetime and the service minimum (10%) will be displayed. The text “service 10” will be blinking.



Reference	Description	Reference	Description
(1)	Protections	(4)	Low
(2)	Service	(5)	Reset
(3)	Level		

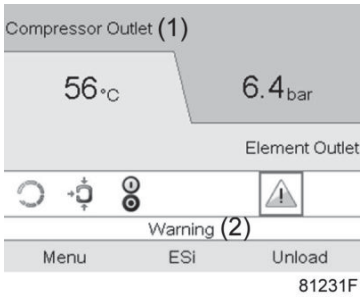
Once the filter has reached a lifetime below 10%, this warning will remain active until new filters are inserted correctly (sensor arm in tower 1 should rest on the filter edge!). When the new filters are installed correctly and the percentage is above 10% (normally between 90% and 100%), press enter to reset the status.

The following display will be shown, and the service warning will disappear.



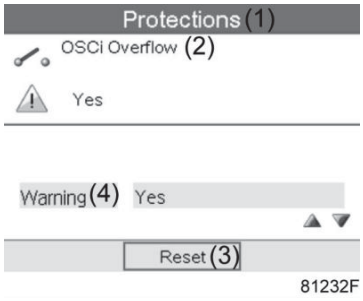
Overflow warning

This is a protection alarm, indicating that the water level in the OSCi is too high. The warning LED will light up at the right side of the Elektronikon® Graphic. In this case consult section Problem solving. If the problem is not solved in time, water can escape from the OSCi and leak onto the compressor frame and outside of the compressor. To consult the warning, navigate the cursor to the warning symbol as shown here:

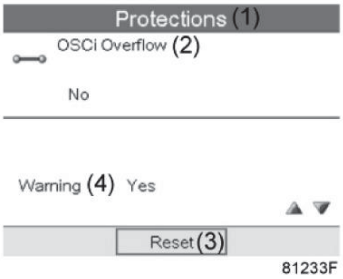


Reference	Description
(1)	Compressor outlet
(2)	Warning

Press the enter button to go into the submenus. Press the down arrow a few times until you reach the following display:



In this display you can see that an overflow warning is issued (blinking “Yes”), indicating that the water level in the OSCi is too high. By fixing the problem (see section Problem solving, this warning will disappear automatically.



Reference	Description	Reference	Description
(1)	Protections	(3)	Reset
(2)	OSCi overflow	(4)	Warning

5.8 Maintenance

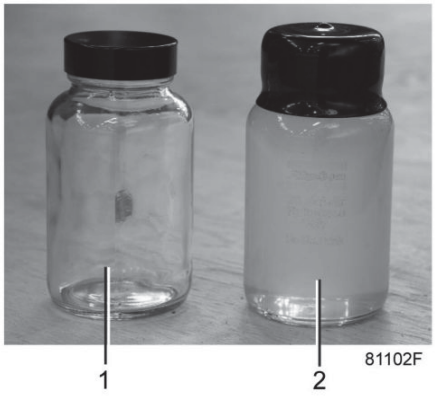
	Check the filters regularly as explained below in order to prevent untreated condensate from entering the sewer. Sample the condensate weekly.

	• If the filters are not installed properly, oil-containing condensate can leave the OSCi. • When new activated carbon filters are placed, the outgoing water may initially look black (caused by carbon dust). This is not harmful. • Each new filter is provided with a label. The correct position is marked on the label. • Used filters can be heavy. • See to it that no condensate comes into contact with eyes, mouth, … • If the compressor has not been in operation during a long period, bacteria formation could occur inside the OSCi. Depending on the amount of bacteria it is advised to clean the OSCi before putting the compressor back into operation.

Checking the condensate

Every week, a test sample should be collected during compressor operation.

1. Open the condensate sample valve at the side of the compressor (drain plate) for 5 seconds and dispose of the collected condensate according to local regulations for oil containing water. (This is to remove the water that remains in the test outlet tube between the OSCi and the compressor back panel).
2. Re-open the test valve and collect the condensate in the test bottle.
3. Compare the turbidity of the sample with the 15 ppm turbidity reference bottle.
4. If the turbidity of the test sample is more intense than the reference turbidity, a request for servicing should be initiated, to be carried out within 2 weeks time. The vertical position of the test outlet ensures that there is enough clean activated carbon left above this position to keep the condensate under 15 ppm for at least 2 weeks (valid for a GA 90 with dryer which runs 24 h/day at reference conditions).



Test/sample bottle (1) and turbidity reference bottle (2)

Oleophilic filter

Initially, the oleophilic filter (3 - Condensate flow scheme) will float almost completely on the condensate and only the bottom part will act as filtration medium. By sorbing more and more oil, the filter will sink and new filter material will be exposed to the condensate. When the top of the filter reaches the surface of the condensate in the first vessel, the filter is saturated and needs to be replaced. This is automatically transmitted to the Elektronikon® regulator via the level sensor (1 - View of OSCi inlet), but the customer can also check this visually through the sight-glass.

Filter replacement instructions

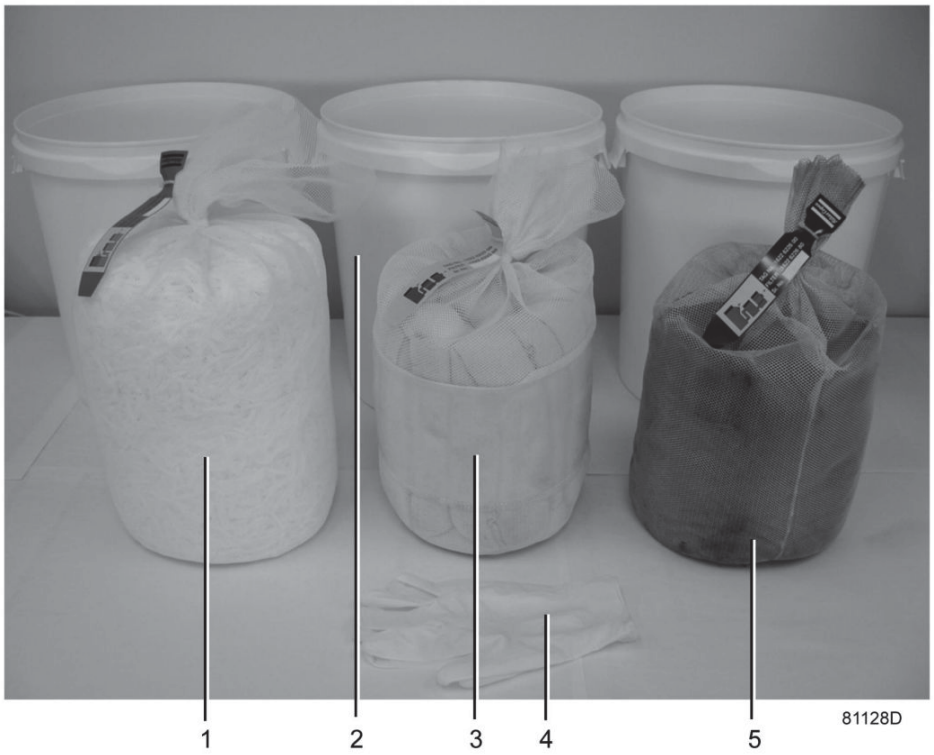
This instruction makes clear which steps have to be taken to do maintenance and to ensure proper functioning after maintenance. These are the steps to be taken when servicing:

1. Stop the compressor and close the air outlet valve. Switch off the voltage.
2. Open/ remove the compressor side panel in front of the OSCi.
3. Position the drain tubes connected to the service drain valves (4 - Condensate flow scheme and View of OSCi) over a recipient and open the drain valves. Wait until the drains are fully discharged and dispose of the oil-containing water according to local regulations.
4. Unscrew the bolts that fix the OSCi to the compressor floor plate and detach the tubes and wires from vessel 2. The OSCi can then be taken out of the compressor. The attached tubes and electrical wires are long enough to slide out the OSCi without disconnecting them, but this should be done carefully, paying attention not to obstruct the tubes and wires.
5. Unscrew the clamping rings, take off the covers and take out the 3 filter bags. The buckets in which the new filters are supplied can be used to store the old filters.

6. Clean out the OSCi with water and tissue. **Do not use any form of soap or detergents** as they could contain dispersants which deteriorate the ability to break oil-water emulsions.
7. Close the service drain valves.
8. Take the new filters from the service kit. Verify that the white filter for vessel 1 is of circular shape. If it is elliptical due to transport, squeeze it into circular shape so that it can move freely up and down in vessel 1. Insert the new filters in the vessels corresponding to their label. **Verify that the sensor arm (8-View of OSCi) is in the upward position and rests on the edge of the filter bag in the first vessel.**
9. Put covers 2 and 3 back on the vessels and tighten the clamping rings.
10. Reposition the OSCi inside the compressor and fix the OSCi to the floor plate with the bolts (M 8). Be careful not to obstruct tubes and wires, and see to it that they can't come into contact with other components of the compressor. Use the cable holder on vessel 2 to fix the redundant parts of the tubes and wires. See to it that the outlet tube and the test tube are nowhere higher than the respective outlet connections on vessel 3 (View of OSCi outlet).
11. Pour clean water along the inner edge of vessel 1 until water flows out of the outlet tube (1-View of OSCi outlet), or until the water reaches the bottom of the sensor chamber (visible through the sight-glass). The oleophilic filter will start to float. Do not push the filter down.
12. Put the cover back on the vessel and tighten the clamping ring.
13. Close/reposition the compressor bodywork.
14. Reset the service counter of the Elektronikon®. See section Elektronikon Warnings.

5.9 Service kits

Atlas Copco has a complete range of service kits available. Service kits comprise all parts needed for servicing components and offer the benefits of using genuine Atlas Copco parts while keeping the maintenance budget low.



OSCi service kit

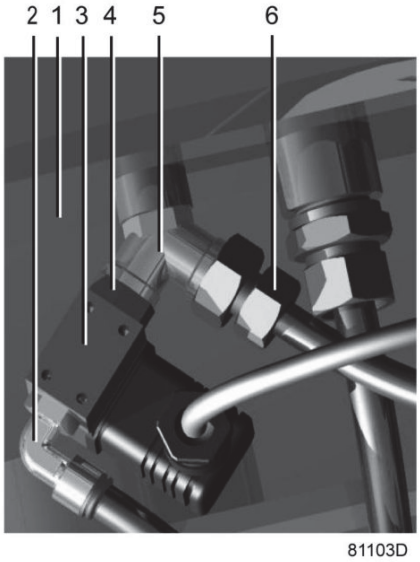
1	Oleophilic filter
2	Buckets (can be used to receive the used filters after maintenance)
3	OGC filter
4	Gloves
5	Activated carbon filter

part number Filter kit OSCi: 2901 1734 00

5.10 Problem solving

Condition	Fault	Remedy
A lot of oil entered the OSCi.	Compressor malfunctioning	Replace all filters. Clean the vessels. Check the compressor.
The Elektronikon® controller shows overflow warning, or visible overflow (sight-glass).	A section of the outlet tube is higher than the corresponding outlet connection.	Reposition the outlet tube to below the outlet connection level (View of OSCi outlet) (check inside and outside the compressor).
	A filter is saturated.	Replace filters and clean the OSCi
	Injected air flow too high	Replace strainer (4-OSCi air injection).

Condition	Fault	Remedy
Water is present on the floor around the compressor (and on the compressor frame).	A connection is leaking. A push-in coupling is leaking.	Stop the compressor. Open the side panel and inspect the OSCi (remove the covers from the vessels). Verify that the drain valves (4 - Condensate flow scheme and View of OSCi) at the bottom of vessel 1 and 2 are closed. Drain the OSCi and try to fix the problem. If a connection is leaking, take out the corresponding tube and cut it off straight 1 cm further. If that doesn't help, order a new connection (spare part).
	No connections are leaking but the water level in vessel 2 or 3 reaches the top of the vessel.	Verify that the outlet tube is positioned everywhere below the outlet connection on vessel 3 (View of OSCi outlet) and is not blocked off somewhere (also outside the compressor). If structural constraints require the outlet pipe to be above the level of the outlet connection on vessel 3, install a pump (suitable to run dry) in the outlet circuit.
	If the above requirements are met and the water level reaches the top of vessel 2, or if the water level in vessel 1 reaches at least the sight glass.	Remove all the filters, clean the OSCi and order a filter service kit to replace the filters. Verify the vessel separator and scavenge line flow, and replace them in case of abnormalities.
		If an overflow is to be avoided at all costs, please ask your service centre to program the Elektronikon® to shut down the compressor when an overflow alarm is generated.
The time frame that it takes for the turbidity of the test sample to be above the limit of the reference sample is much shorter than expected, based on the estimated filter lifetime. See also section Technical data.		When servicing the filters, the following test procedure must be carried out after draining the vessels: Disconnect the OSCi air tube at the bottom of vessel 2, and guide the air tube through the baffles to outside the compressor canopy. Close all compressor panels, start the compressor and wait for loading condition. Check if airflow is coming out of the airtube (must be between 450 and 1000 l/h) (between 15.9 and 35.3 cu ft/h). Stop the compressor.
	No enough air flow during the test.	Disconnect the strainer (4-View of OSCi inlet) and take out the strainer. Clean the strainer and the nozzle with compressed air and dry tissue. Check that the air tube does not touch any other components and is not hindered in any way. Repeat the test procedure. If the airflow coming out of the air tube is still not sufficient, order a spare part solenoid valve (3-OSCi air injection). In case there was enough airflow during the test, check to see if there is a thick oily condensate present in all 3 vessels. Then check the oil separator element and the scavenge line flow of the compressor and order the corresponding service kits in case these components are not working correctly.



OSCi air injection

1	Aftercooler (WSD in case of a water-cooled compressor)	4	Strainer
2	Air tube to OSCi vessel 2	5	Y-connection
3	Solenoid valve	6	Air tube to EWD

Automatic as well as manual safety devices to prevent overflow are present. Besides the automatic overflow switch (7-View of OSCi), which is mounted in a side-chamber on the second vessel and gives an alarm when condensate level is too high, the customer can check for high condensate level through the sight glass. On a case-by-case basis, it can be decided to automatically shut down the compressor in case of an overflow alarm. When overflow occurs, the resulting waste water must be treated as oil-containing water and must be disposed of according to local regulations.

6 Energy recovery (optional)

6.1 Energy recovery unit

Description

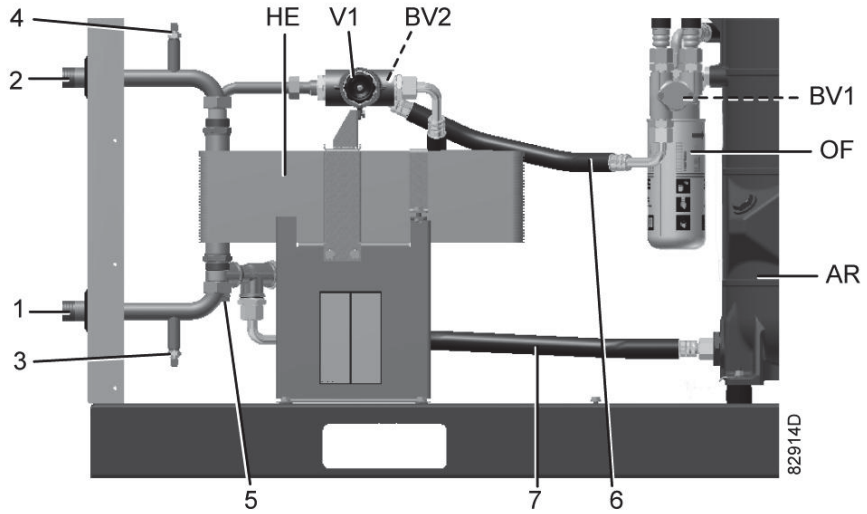
A large part of the energy required for any compression process is transformed into heat. For GA oil-injected screw compressors, the major part of the compression heat is dissipated through the oil system. The Atlas Copco energy recovery (ER) systems are designed to recover most of the above-mentioned heat by transforming it into warm or hot water without any adverse influence on the compressor performance. The water can be used for diverse applications.

Components

The energy recovery system is completely integrated and mainly comprises:

- Stainless steel oil/water heat exchanger
- Selector wheel (V1) to enable/disable Energy Recovery
- Thermostatic by-pass valve for energy recovery heat exchanger(s) (BV2)
- Two temperature sensors for water inlet and outlet control (3 and 4)
- The necessary bolts, flexibles, etc.

Energy recovery unit (ER-unit)



Main components of the ER unit

Reference	Designation
1	Water inlet pipe
2	Water outlet pipe
3	Temperature sensor, water inlet pipe
4	Temperature sensor, water outlet pipe

Reference	Designation
5	Oil drain plug
6	Oil line from compressor oil separator vessel to ER unit
7	Oil line from ER unit to oil filter housing
BV2	Location of heat exchanger by-pass valve (BV2)
HE	Heat exchanger
V1	Selector valve
AR	Oil separator vessel
OF	Oil filter housing
BV1	Location of oil cooler bypass valve (BV1)

Field installation

The main components are assembled ex-factory as a compact unit which fits inside the bodywork of the compressor. Consult Atlas Copco for installing and connecting the energy recovery unit.

6.2 Energy recovery systems

General

The energy recovery systems can be applied as low temperature rise/high water flow systems or as high temperature rise/low water flow systems.

Low temperature rise/high water flow systems

For this type of application, the temperature difference between the water in the energy recovery system and the compressor oil is low. As a consequence, a high water flow is needed for maximum energy recovery.

Example: The heated water is used to keep another medium at a moderately high temperature, in a closed circuit, e.g. central heating.

High temperature rise/low water flow systems

For this type of application, a high water temperature rise in the energy recovery system is obtained, which consequently brings on a low flow rate.

Example: An open circuit where cold water from a main supply is heated by the energy recovery system for use in a factory, e.g. pre-heating of boiler feed water.

Recovery water flow

For the references, see section Energy recovery data.

The recovery water enters the unit at inlet connection (1). In heat exchanger (HE) the compression heat is transferred from the compressor oil to the water. The water leaves heat exchanger (HE) via outlet connection (2).

Water requirements for closed water circuits

The use of a closed water circuit minimises make-up water requirements. Therefore, the use of soft or even demineralised water is economically feasible and eliminates the problem of scale deposits. Although the heat exchanger is made of stainless steel, the water circuit connected to the compressor may require corrosion inhibitors. Consult section Cooling water requirements to minimise problems due to bad water quality. If in any doubt, consult Atlas Copco.

Add an anti-freeze product such as ethylene-glycol to the water in proportion to the expected temperature to avoid freezing.

Water requirements for open water circuits

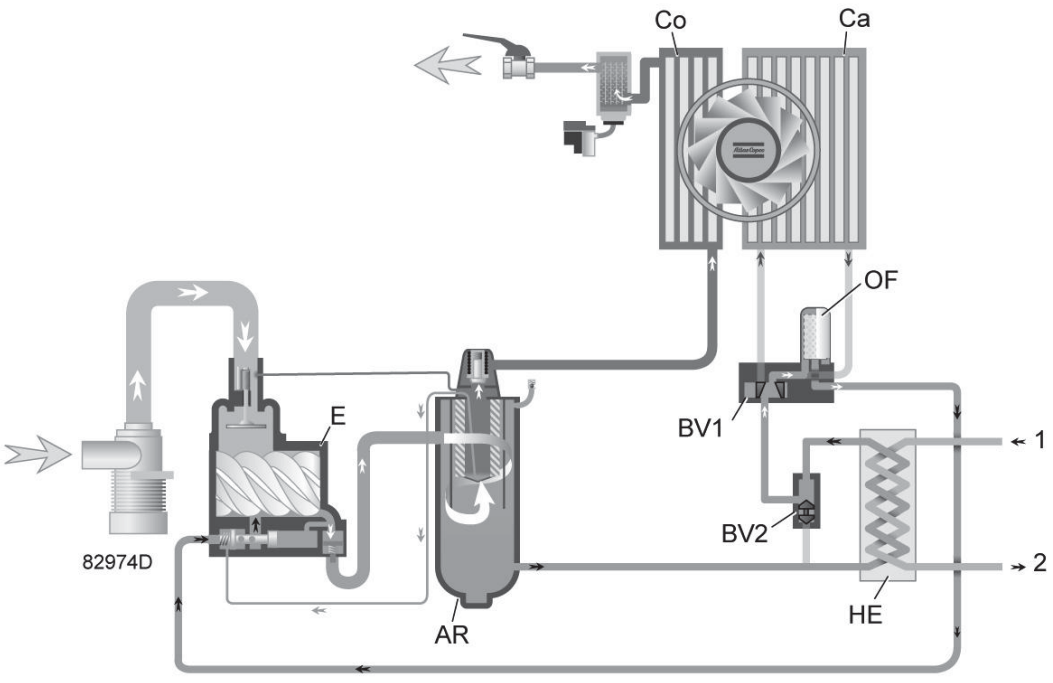
For open, non-recirculation water circuits, the major problems usually encountered are related to deposit control, corrosion control and microbiological growth control. To minimize these problems, the water should meet a number of requirements. See section Cooling water requirements. If in any doubt, consult Atlas Copco.

6.3 Operation

Description

The compressor oil flow is controlled by two thermostatic valves (BV1 and BV2), ensuring reliable compressor operation and optimum energy recovery.

Bypass valve (BV1) is integrated in the oil filter housing of the compressor and controls the oil flow through the main oil cooler (Co) of the compressor. Bypass valve (BV2) controls the oil flow through the oil/water heat exchanger (HE) of the ER unit. Both valves consist of an insert (thermostat) mounted in a housing.



Flow diagram of compressor with energy recovery system

Reference	Designation	Reference	Designation
BV2	Thermostatic bypass valve of ER unit	OF	Oil filter
HE	Oil/water heat exchanger (ER unit)	AR	Oil separator vessel
E	Compressor element	BV1	Thermostatic bypass valve in oil filter housing
Co	Oil cooler (compressor)	Ca	Aftercooler (compressor)
1	Water inlet	2	Water outlet

BV2 starts closing the bypass line over the heat exchanger (HE) at the lower limit of its temperature range. At the upper limit of its temperature range, the bypass line is completely closed and all the oil flows through the ER heat exchanger.

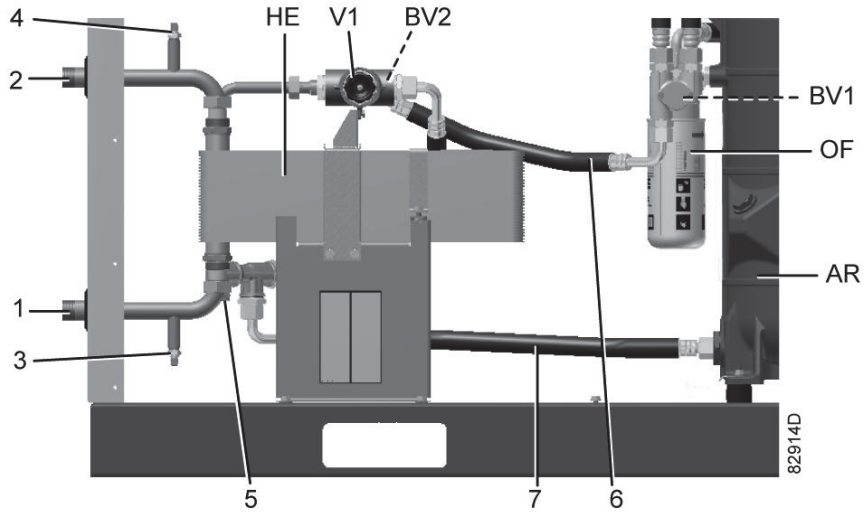
Variable speed driven (VSD) air-cooled compressors are equipped with a bypass valve BV2 that starts opening at 40 ˚C (104 ˚F) and which is completely open at 55 ˚C (131 ˚F).

Variable speed driven (VSD) water-cooled compressors are equipped with a bypass valve BV2 that starts opening at 60 ˚C (140 ˚F) and which is completely open at 75 ˚C (167 ˚F).

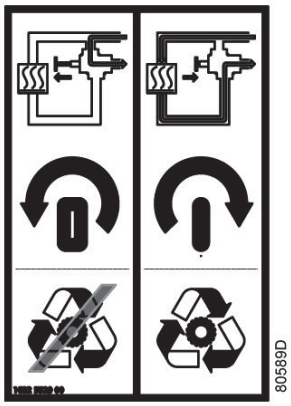
The housing of BV2 is provided with a special wheel (V1), allowing to control the energy recovery system.

As can be seen on the ER label, the ER unit is integrated in the oil circuit and will recover energy when the wheel is completely turned in clockwise.

When the wheel is turned out anticlockwise, the heat exchanger (HE) is bypassed and no energy will be recovered.



Position of valve housing of BV2 with wheel V1



ER label

	Attention: It is only allowed to turn the wheel completely in or out. No in-between position is allowed!

The oil cooler bypass valve (BV1) starts closing the bypass over the oil cooler (Co) at the lower limit of its temperature range. At the upper limit of its temperature range, the bypass is completely closed and all the oil flows through the oil cooler (Co).

BV1 must have a higher opening temperature (set point) than BV2 in order to prevent the heat from being dissipated in the compressor oil cooler (Co) rather than in the oil/water heat exchanger (HE) when using the compression heat as source for energy recovery.

Thermostat BV1 starts to open at 60 ˚C (140 ˚F) and is completely open at 75 ˚C (167 ˚F).

Energy recovery system in use (see drawing)

The wheel (V1) of BV2 (bypass valve of the HE) is totally **turned in clockwise**.

- Compressor start-up

When the compressor is started up from cold, the oil temperature will be low. Bypass valve (BV2) shuts off the oil supply through the heat exchanger (HE) and bypass valve (BV1) shuts off the oil supply through the oil cooler (Co) to prevent the compressor oil from being cooled. The oil flows from the oil separator vessel (AR) through the oil filter(s) (OF) back to compressor element (E).

All energy input is used to rapidly warm up the compressor oil. No energy is recovered.

- Maximum energy recovery

As soon the oil temperature reaches the set point (opening temperature) of bypass valve (BV2), the valve starts closing off the bypass over the heat exchanger (HE) oil line, gradually allowing the oil to flow through the heat exchanger (HE). As the oil temperature rises to approx. 15 ˚C (27 ˚F) above the set point, all the oil passes through the heat exchanger. The exchange of heat between the compressor oil and the heat recovery water is maximum. The oil from the heat exchanger outlet flows via oil filter (OF), oil stop valve (Vs - if present), compressor element (E) and separator (AR) back to the inlet of heat exchanger (HE). Bypass valve (BV1) bypasses the oil cooler (Co) as long as the oil temperature remains below its set point.

Operation principle at different loads:

- Low consumption of recovered energy

The temperature of the oil leaving heat exchanger (HE) rises. When the temperature rises above its set point, oil cooler bypass valve (BV1) will gradually allow the oil to be cooled in the oil cooler (Co).

- Recovery water flow too high/temperature too low
 In this case, bypass valve (BV2) will open the bypass line allowing oil from heat exchanger (HE) to be mixed with oil from separator (AR). Energy is transferred from the compressor oil to the water, but at a relatively low temperature level.

Energy recovery system not in use

The wheel (V1) is **completely turned out anti-clockwise**.

The oil circuit is the same as without installation of the energy recovery system.

No energy is recovered.

This situation should be considered as exceptional, e.g. in case of maintenance of the energy recovery system or when no energy is required for a long period.

On VSD compressors: close the air outlet valve and run the unit at minimum speed for a few minutes before isolating the energy recovery system from the compressor.

Stopping the unit for a long period

In case of an open water system and/or if freezing temperatures can be expected, isolate the compressor water system and blow it through with compressed air.

6.4 Maintenance

Compressor oil

For references used consult section Energy recovery unit.

Oil change:

1. Check if the wheel (V1) is totally turned in clockwise (energy recovery in use).
2. Run the unit until warm. Stop the unit, switch off the isolating switch and close the air outlet valve of the compressor.
3. Depressurize the compressor and drain the oil by opening the drain valve. Also drain the oil from the heat exchanger by removing the drain plug on the oil piping of the ER-unit. Reinstall the drain plug after draining.
4. Resume oil change as described in section Oil and Filter Change in this book.

Thermostatic bypass valves

The inserts (thermostats) must be replaced by new ones when abnormal function is noticed. Examples: regulating temperature is not within the normal range, ER heat exchanger remains cold,...

Heat exchanger (HE)

If the temperature rise over the energy recovery system declines over a period of time with the same basic working conditions, the heat exchanger should be inspected. To clean the oil side, soak the heat exchanger in a degreasing solution. To remove scale formation in the water compartment, a proper descaling process should be applied. Consult Atlas Copco.

6.5 Energy recovery data

Reference conditions

See section Reference conditions and limitations.

Effective working pressure

Consult section Compressor data for the normal working pressure.

Maximum allowed pressure of the heat exchanger

Oil side	15 bar (217 psi)
Water side	10 bar (145 psi)

Reading settings

In addition to other data, the following temperatures can be read on the Elektronikon display:

For air-cooled units:
- The water inlet temperature of the energy recovery system
- The water outlet temperature of the energy recovery system

For water-cooled units:
- The water inlet temperature of the energy recovery system
- The water outlet temperature of the energy recovery system
- The cooling water outlet temperature of the compressor

Modifying settings

If the programmed warning settings for the water temperatures are exceeded, a warning indication is shown on the compressor control module:

Temperature input		Minimum setting	Nominal setting	Maximum setting
Water inlet temperature of energy recovery	˚C	0	50	99
Water inlet temperature of energy recovery	˚F	32	122	210
Energy recovery water outlet temperature	˚C	0	Depends on application	99
Energy recovery water outlet temperature	˚F	32	Depends on application	210

To modify a setting, consult the relevant section in the description of the Elektronikon controller.

Recoverable energy

The recoverable energy can be calculated from:

RECOVERED ENERGY (kW) = 4.2 x water flow (l/s) x water temperature rise (˚C)

In the tables below, typical examples are given.

Data for low temperature rise/high water flow systems

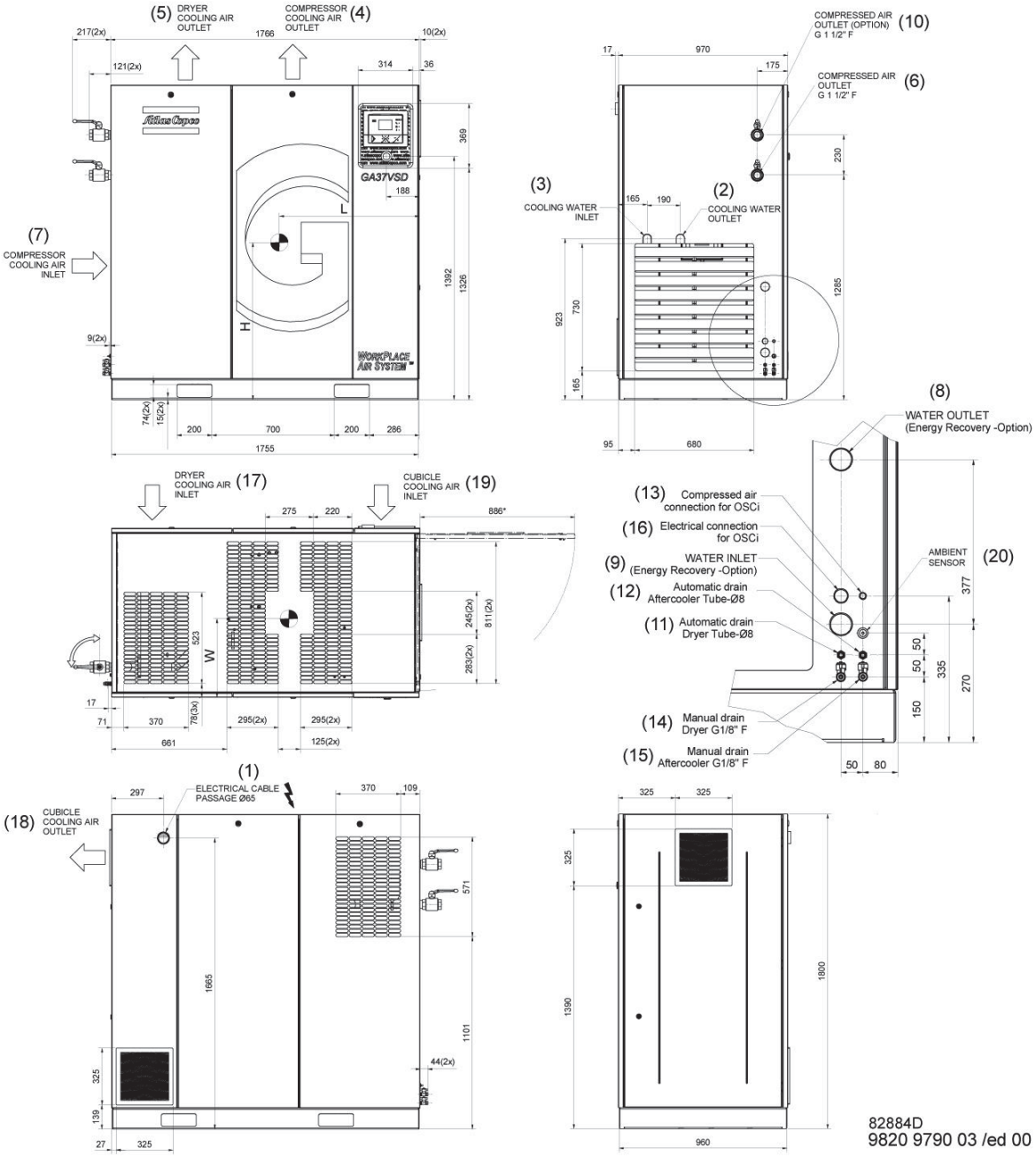
Parameter		GA37 VSD	GA 45 VSD
Recoverable energy	kW	32.5	39.5
Recoverable energy	hp	44.2	53.7
Water flow	l/min	46.6	56.6
Water flow	cfm	1.7	2.0
Temperature at inlet	˚C	50	50
Temperature at inlet	˚F	122	122
Temperature at outlet	˚C	60	60
Temperature at outlet	˚F	140	140

Data for high temperature rise/low water flow systems

Parameter		GA37 VSD	GA 45 VSD
Recoverable energy	kW	32.5	39.5
Recoverable energy	hp	44.2	53.7
Water flow	l/min	6.5	7.9
Water flow	cfm	0.2	0.3
Temperature at inlet	˚C	20	20
Temperature at inlet	˚F	68	68
Temperature at outlet	˚C	92	92
Temperature at outlet	˚F	198	198

7 Installation

7.1 Dimension drawings



Dimensions GA 37 VSD and GA 45 VSD

Reference	Designation
1	Electric cable passage
2	Cooling water outlet
3	Cooling water inlet
4	Compressor cooling air outlet
5	Dryer cooling air outlet
6	Compressed air outlet
7	Compressor cooling air inlet
8	Water outlet (Energy recovery - option)
9	Water inlet (Energy recovery - option)
10	Compressed air outlet (option)
11	Automatic drain, dryer
12	Automatic drain, aftercooler
13	Compressed air connection for OSCi
14	Manual drain, dryer
15	Manual drain, aftercooler
16	Electrical connection for OSCi
17	Dryer cooling air inlet
18	Cubicle cooling air outlet
19	Cubicle cooling air inlet
20	Ambient sensor

Centre of gravity

		with dryer	with dryer	with dryer	without dryer	without dryer	without dryer
Type		**L**	**W**	**H**	**L**	**W**	**H**
GA 37 VSD	mm	955	440	800	915	435	765
GA 37 VSD	in	376	173	315	360	171	301
GA 45 VSD	mm	955	440	800	915	435	765
GA 45 VSD	in	376	173	315	360	171	301

Dimensions +/- 50 mm (1.97 in)

Weight

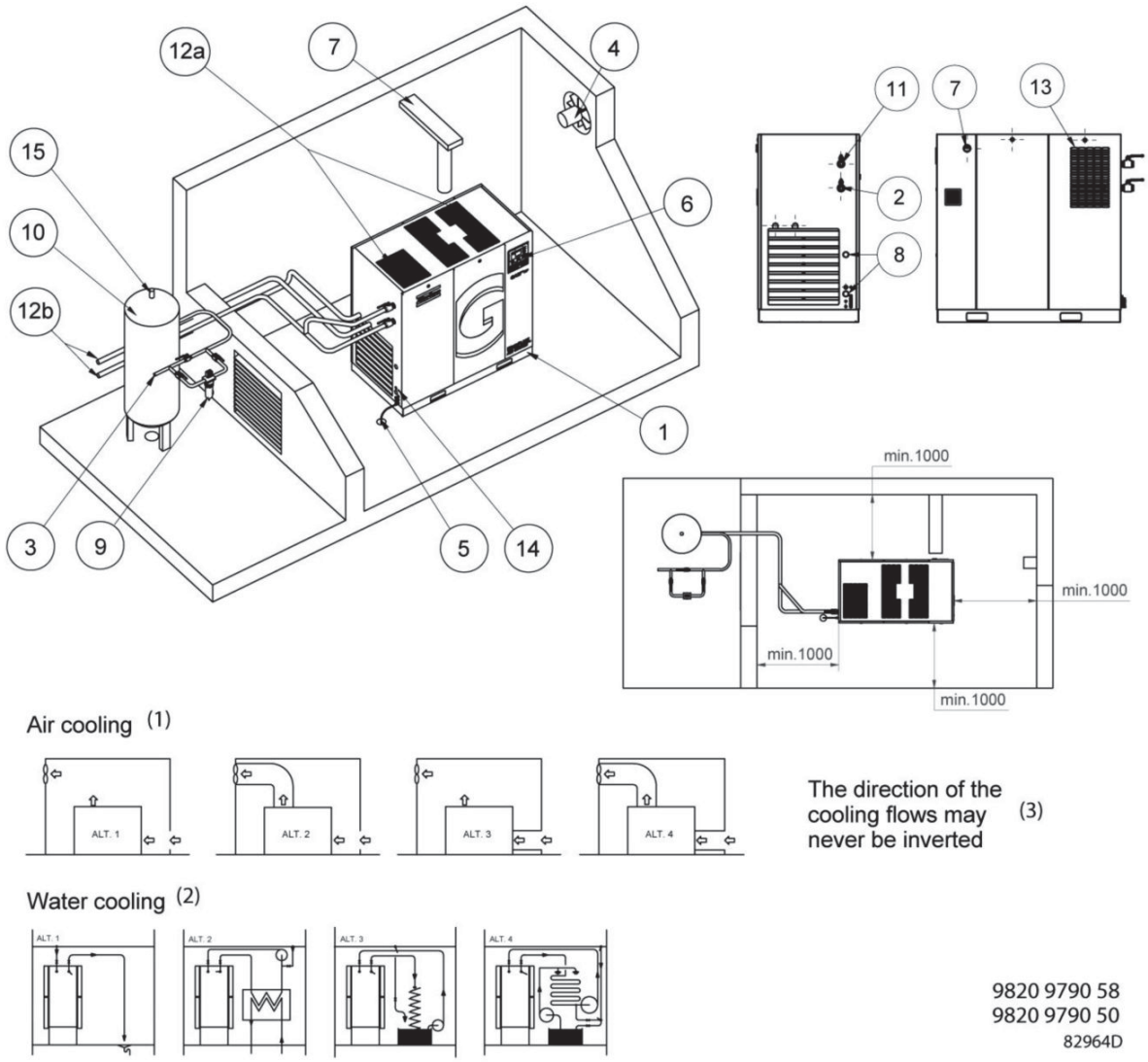
Type	Unit	Weight, unit with dryer	Weight, unit without dryer
GA 37 VSD	kg	1185	1100
GA 37 VSD	lb	2610	2420
GA 45 VSD	kg	1190	1100
GA 45 VSD	lb	2625	2425

Weights (oil included) +/- 50 kg (110 lb)

Dimensions and weights in tables for air cooled units, 380V-460V.

7.2 Installation proposal

Compressor room example



Compressor room example

(1)	Air cooling
(2)	Water cooling
(3)	The direction of the cooling flows may never be inverted

Description

1	Compressor Install the compressor unit on a solid, level floor, suitable for taking its weight.

2	Position of the compressed air outlet valve.
3	The pressure drop over the air delivery pipe can be calculated from: $\Delta p = (L \times 450 \times Q_c^{1.85}) / (d^5 \times P)$, with d = inner diameter of the pipe in mm Δp = pressure drop in bar (recommended maximum: 0.1 bar (1.5 psi)) L = length of the pipe in m P = absolute pressure at the compressor outlet in bar(a) Q_c = free air delivery of the compressor in l/s It is recommended that the connection of the compressor air outlet pipe is made on top of the main air net pipe in order to minimize carry-over of possible condensate residue.
4	Ventilation: the inlet grids and ventilation fan should be installed in such a way that any recirculation of cooling air to the compressor or dryer is avoided. The maximum air velocity through the grids is 5 m/s (16.5 ft/s). The maximum allowed pressure drop in ventilation ducts before or after the compressor is 30 Pa. The maximum air temperature at the compressor intake is 46 ˚C (115 ˚F), the minimum temperature is 0 ˚C (32 ˚F). • **For air-cooled compressors and ventilation alternatives 1 and 3, the ventilation capacity required to limit the compressor room temperature can be calculated as follows:** • For compressors without dryer: $Q_v = 1.06\ N/\Delta T$ • For compressors with dryer: $Q_v = (1.06\ N + 1.2\ D)/\Delta T$ with Q_v = required ventilation capacity in m^3/s N = nominal power of the compressor motor in kW D = electric power of the dryer in kW ΔT = temperature increase in the compressor room in °C **For ventilation alternatives 2 and 4:** the fan capacity should match the compressor fan capacity at a pressure head equal to the pressure drop over the air ducts. • **For water-cooled compressors, the ventilation capacity required to limit the compressor room temperature can be calculated from:** • For compressors without dryer: $Q_v = 0.13\ N/\Delta T$ • For compressors with dryer: $Q_v = (0.13\ N + 1.2\ D)/\Delta T$ with Q_v = required ventilation capacity in m^3/s N = nominal power of the compressor motor in kW D = electric power of the dryer in kW ΔT = temperature increase in the compressor room in °C The cooling air of the dryer can be ducted outside.
5	The drain pipes to the drain collector must not dip into the water of the drain collector. Atlas Copco has oil/water separators (type OSD or OSCi) to separate the oil from the condensate to ensure that the condensate meets the requirements of the environmental codes. Drain pipes of different compressors may not be interconnected before the (atmospheric) collector as this can damage the electronic drains.
6	Control module with monitoring panel.
7 	Power supply cable to be sized and installed by a qualified electrician. To preserve the protection degree of the electric cubicle and to protect its components from dust from the environment, it is mandatory to use a proper cable gland when connecting the supply cable to the compressor.
8	Provision for energy recovery system.

9	Filter DD for general purpose filtration (particle removal down to 1 micron with a maximum oil carry over of 0.5 mg/m^3. A high-efficiency filter, type PD, may be installed downstream of a DD filter. This filter traps solid particles down to 0.01 micron with a maximum oil carry-over of 0.01 mg/m^3. If oil vapors and odors are undesirable, a QD type filter can be installed downstream of the PD filter. It is recommended to install bypass pipes with ball valves over each filter in order to isolate the filters during service operations without disturbing the compressed air delivery.
10	Install the air receiver (to be purchased separately) in a frost free room, on a solid, level floor, suitable for taking its weight. For normal air consumption, the volume of the air net (receiver and piping) can be calculated from: $V = (0.25 \times Q_c \times P1 \times T0)/(fmax \times \Delta P \times T1)$, with V = volume of the air net in l Q_c = free air delivery of the compressor in l/s P1 = compressor air inlet pressure in bar(a) fmax = maximum cycle frequency (recommended: 1 cycle/30s) ΔP = difference between unloading pressure and loading pressure in bar T1 = compressor air inlet temperature in K T0 = air receiver temperature in K
11	Bypass system to bypass the dryer during service operations (available as an option, consult Atlas Copco).
12a	Air-cooled compressors: To prevent feedback of exhaust air into the cooling inlet, sufficient space should be foreseen above the unit to evacuate the exhaust air. Otherwise a duct for the exhaust air should be installed. See alternatives 1 up to 4.
12b	Water-cooled compressors: Water flow and pressure to be adjusted depending upon local conditions. For cooling water quality, see section Cooling water requirements. A water shut-off valve and a water drain valve should be installed by the customer in the compressor water inlet pipe and outlet pipe. If water shut-off valves at the compressor water inlet and outlet pipe are installed, a safety device with set pressure according to the maximum cooling water inlet pressure (see section Reference conditions and limitations) has to be installed between the compressor water outlet pipe and shut-off valve. When operating the unit, the operator must ensure that the cooling water system cannot be blocked. The above mentioned applies also to the energy recovery cooling water system. Remove the plastic plugs (if provided) from the compressor water pipes and connect the pipes to the cooling water circuit.
13	Cooling air grating, dryer
14	When a duct is foreseen on the air inlet, the ambient temperature sensor need to be repositioned in such a way that the inlet temperature is monitored.
15	Safety valve

Safety

	The operator must apply all relevant safety precautions, including those mentioned in this book.

Outdoor/altitude operation

Fix speed compressors can be sold with option rain protection. With this option, this compressor can be installed outside under a shelter, in frost free conditions. If frost might occur, the appropriate measures should be taken to avoid damage to the machine and its ancillary equipment. In this case, and also if operating above 1000 m (3300 ft), consult Atlas Copco.

Moving/lifting

The compressor can be moved by a lift truck using the slots in the frame. Take care not to damage the bodywork during lifting or transport. Before lifting, reinstall the transport securing bolts. Make sure that the forks protrude from the other side of the frame. The compressor can also be lifted after inserting beams in the slots. Make sure that the beams cannot slide and that they protrude from the frame equally. The chains must be held parallel to the bodywork by chain spreaders in order not to damage the compressor. The lifting equipment must be placed in such a way that the compressor is lifted perpendicularly. Lift gently and avoid twisting.

⚠	In case of units equipped with the Lifting Device Option, it is not allowed to lift the compressor if the canopy parts or lifting supports are not completely installed. When the compressor is being lifted, it is also forbidden to come under the load or to perform maintenance activities to it.

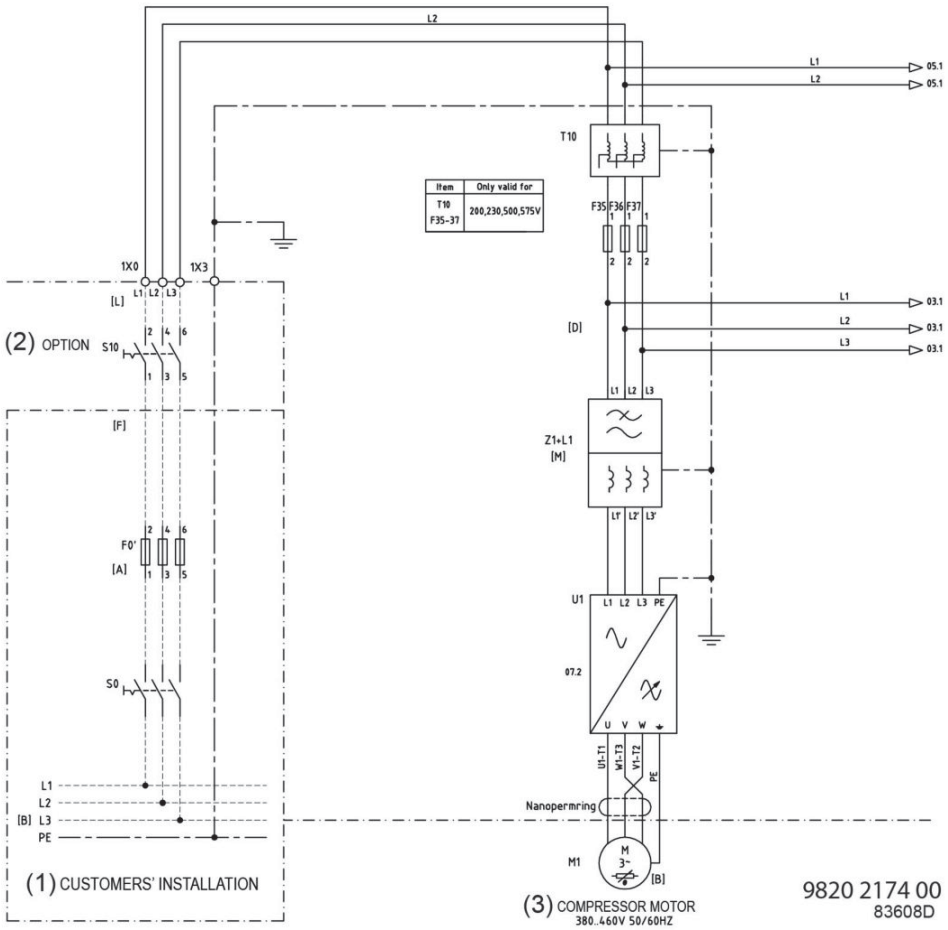
7.3 Electrical connections

Important remark

⚠	Working with machinery controlled by a frequency converter requires special safety precautions. These safety precautions depend on the kind of network used (TN, TT, IT system). Consult Atlas Copco.

	Most compressors are designed for use in TT/TN networks and are intended for industrial environments where the electrical supply is separated from the residential/commercial supply network. To use the machine in light industrial, commercial or residential environments with a shared supply network or in an IT network, extra measures can be required. Contact Atlas Copco. Set the switch (S) on (I) for use in a TT/TN network, and set the switch off (O) for use in an IT network. 

Electrical connections for GA 37 VSD and GA 45 VSD



Reference	Designation
(1)	Customer's installation
(2)	(Available as) option
(3)	Compressor motor

Note

The complete electrical diagram can be found in the electrical cubicle.

Description

1. Provide an isolating switch.
2. Check that the motor cables and wires inside the electric cabinet are clamped tight to their terminals.
3. Check the fuses. See section Electric cable size and fuses
4. Connect the power supply cables to terminals (1, 3 and 5) on contactor (K21) of the Control Technics converter.
 Connect the power supply cables to terminals (1, 3 and 5) on contactor (Z1+L1) of the Neos converter.
5. Connect the earth conductor to the earth bolt (PE).

	To preserve the protection degree of the electric cubicle and to protect its components from dust from the environment, it is mandatory to use a proper cable gland when connecting the supply cable to the compressor.

Compressor status indication

The Elektronikon® Graphic controller is provided with potential-free auxiliary NO contacts (NO = normally open) (K05, K07 and K08) for remote indication of:

- Manual or automatic operation (K07)
- Warning condition (K08)
- Shut-down condition (K05)

Maximum contact load: 10 A / 250 V AC.

Stop the compressor and switch off the voltage before connecting external equipment. Consult Atlas Copco.

Compressor control modes

See also section Control mode selection.

The following control modes can be selected:

- **Local control:** The compressor will react to commands entered by means of the buttons on the control panel. Compressor start/stop commands via Clock function are active, if programmed.
- **Remote control:** The compressor will react to commands from external switches. Emergency stop remains active. Compressor start/stop commands via Clock function are still possible.

	Have the modifications checked by Atlas Copco. Stop the compressor and switch off the voltage before connecting external equipment. Only potential-free contacts are allowed.

- **LAN control:** The compressor is controlled via a local network. Consult Atlas Copco.

7.4 Cooling water requirements

General

	Cooling water needs to fulfill certain requirements in order to avoid problems of scaling, fouling, corrosion or bacterial growth. In open circuit cooling towers, protective measures must be taken to avoid the growth of harmful bacteria such as legionella pneumophila when there is a risk of inhalation of the water droplets.

No general recommendation can encompass the effects of all combinations of the various compounds, solids and gases typically found in cooling water in interaction with different materials. Therefore the recommendations formulated in our Cooling Water Specifications are a general guide line for acceptable coolant quality. However, where strict limits apply, a statement is made in the specification.

The water requirements refer to untreated water. When water is treated, some parameters will change. Water treatments should be carried out by a specialized water treatment company, taking the responsibility for the performance of the treated cooling water and the compatibility with the materials in the cooling circuit. This includes not only the selection of the appropriate additives, but also the correct application, monitoring of concentrations and properties, prevention of sludge formation and maintenance of the system. This applies

also to treatment with antifreeze products. They must be provided with suitable stabilizers and inhibitors. Specifications are also depending on the type of cooling circuit (open, once through / recirculating with tower / closed) and on the application (Standard – max 65 °C cooling water temperature at the outlet) or Energy Recovery (water temperature up to 95 °C).

In case water is not in line with recommended values or if any doubt, consult the manufacturer.

Cooling water parameters

1. **pH**
 The effect of pH is already included in the Ryznar Stability Index (RSI - see item 4 below), but also the pH itself is subject to limitations:

		pH	
Type of cooling system	**Materials**	**Standard**	**Energy recovery**
Single pass	Containing copper	**6.8** - **9.3**	**6.8** - **9.3**
	Stainless steel with carbon steel and / or cast iron	**6.8** - 9.3	**6.8** - 9.3
	Stainless steel only	**6** - 9.3	**6** - 9.3
Recirculating (with tower)	Containing copper	**6.8** - **9.3**	not applicable
	Stainless steel with carbon steel and / or cast iron	**6.8** - 9.3	
	Stainless steel only	**6** - 9.3	
Closed loop	Containing copper	**7.5** - **9.3**	**7.5** - **9.3**
	Stainless steel with carbon steel and / or cast iron	**7.5** - 9.3	**7.5** - 9.3
	Stainless steel only	**6** - 9.3	**6** - 9.3

 The values in **bold** are rejection limits.
 When the system contains Zn or Al, the pH must be < 8.5.
2. **Total dissolved solids (TDS) and conductivity**
 The conductivity is expressed in µS/cm, the TDS in ppm.
 Both parameters are related with each other. The conductivity is convenient for quick monitoring of general water quality, but the TDS is required for calculating the RSI. If only one of both parameters is measured, an estimation can be obtained by using a theoretical conversion factor (0.67):
 TDS = conductivity x 0.67
3. **Hardness**
 Different types of hardness are in relation with each other and together with the pH and the alkalinity of the water they determine the equilibrium situation of the water, determined and specified by the RSI.
 In addition, the calcium hardness must be limited to:

	Ca (ppm Ca CO_3)	
Type of cooling system	**Standard**	**Energy recovery**
Single pass	< 500	< 2
Recirculating (with tower)	< 500	not applicable
Closed loop	< 1000	< 50

4. **The Ryznar Stability Index (RSI)**
 The Ryznar Stability Index is a parameter for predicting whether water will tend to dissolve or precipitate calcium carbonate. The adhesion of scaling depositions and their effect are different on different materials,

but the equilibrium of the water (scaling or corrosive) is only determined by its actual pH value and by the saturation pH value (pH_s). The saturation pH value is determined by the relationship between the calcium hardness, the total alkalinity, the total solids concentration and the temperature.
The Ryznar Stability Index is calculated as follows:
$RSI = 2*pH_s - pH$,
in which

- pH = measured pH (at room temp) of the water sample
- pH_s= pH at saturation

pH_s is calculated from:
$pH_s = (9.3 + A + B) - (C + D)$,
in which

- A : depends on the total solids concentration
- B : depends on the water temperature at the outlet of the heat exchanger
- C : depends on the calcium hardness ($CaCO_3$)
- D : depends on the HCO_3^- concentration or M-alkalinity

The values of A, B, C and D can be found in below table:

Total dissolved solids (mg/l)	A	Temperature (°C)	B	Ca hardness (ppm $CaCO_3$)	C	M-Alkalinity (ppm $CaCO_3$)	D
< 30	0.1	0 - 1	2.3	9 - 11	0.6	10 - 11	1.0
30 - 320	0.2	2 - 6	2.2	12 - 14	0.7	12 - 14	1.1
> 320	0.3	7 - 11	2.1	15 - 17	0.8	15 - 17	1.2
		12 - 16	2.0	18 - 22	0.9	18 - 22	1.3
		17 - 22	1.9	23 - 28	1.0	23 - 28	1.4
		23 - 27	1.8	29 - 35	1.1	29 - 35	1.5
		28 - 32	1.7	36 - 44	1.2	36 - 44	1.6
		33 - 38	1.6	45 - 56	1.3	45 - 56	1.7
		39 - 43	1.5	57 - 70	1.4	57 - 70	1.8
		44 - 49	1.4	71 - 89	1.5	71 - 89	1.9
		50 - 55	1.3	90 - 112	1.6	90 - 112	2.0
		56 - 61	1.2	113 - 141	1.7	113 - 141	2.1
		62 - 67	1.1	142 - 177	1.8	142 - 177	2.2
		68 - 73	1.0	178 - 223	1.9	178 - 223	2.3
		74 - 79	0.9	224 - 281	2.0	224 - 281	2.4
		80 - 85	0.8	282 - 355	2.1	282 - 355	2.5
		86 - 91	0.7	356 - 446	2.2	356 - 446	2.6
		92 - 95	0.6	447 - 563	2.3	447 - 563	2.7
				564 - 707	2.4	564 - 707	2.8
				708 - 892	2.5	708 - 892	2.9
				893 - 1000	2.6	893 - 1000	3.0

Interpretation of the values obtained:

- RSI < 6: boiler scale formation
- 6 < RSI < 7: neutral water

- RSI > 7: corrosive water

	As a general rule, the RSI index should be between 5.6 and 7.5. If that is not the case, contact a specialist.

5. **Free chlorine (Cl_2)**
 Disinfecting with chlorine is **not done in closed systems, neither in energy recovery systems**.
 A continuous level of 0.5 ppm should not be exceeded. For shock treatments, a maximum limit of 2 ppm for maximum 30 minutes/day applies.
6. **Chlorides (Cl^-)**
 Chloride ions will create pitting corrosion on stainless steel. Their concentration should be limited, depending from the RSI value.

	RSI < 5.5	5.6 < RSI < 6.2	6.3 < RSI < 6.8	6.9 < RSI < 7.5	7.6 < RSI
Cl^- (ppm)	200	350	500	350	200

For energy recovery systems, the limit is 100 ppm.

7. **Sulphates (SO_4^{2-})**

	Sulphate (ppm)	
Type of cooling system	**Standard**	**Energy recovery**
Single pass	< 1000	< 200
Recirculating (with tower)	< 1000	not applicable
Closed loop	< 400	< 200

8. **Iron and Manganese**

	Dissolved iron (ppm)		Dissolved manganese (ppm)	
Type of cooling system	**Standard**	**Energy recovery**	**Standard**	**Energy recovery**
Single pass	< 1	< 0.2	< 0.2	< 0.05
Recirculating (with tower)	< **1**	not applicable	< **0.2**	not applicable
Closed loop	< 1	< 0.2	< 0.2	< 0.05

The values in **bold** are rejection limits.

9. **Copper**

	Copper (ppm)	
Type of cooling system	**Standard**	**Energy recovery**
Single pass	< 1	< 0.2
Recirculating (with tower)	< 1	not applicable
Closed loop	< 1	< 0.2

10. **Ammonium**
 The limit of **0.5 ppm** is a rejection limit.
 The limitation only applies for copper containing systems.
11. **Suspended solids**
 Large particles (size > 10 µm) should not be present as they can be filtered out.

Small particles (< 0.5 µm) are not taken into account.
For particles between 0.5 µm and 10 µm, the following limits apply:

	Suspended solids (ppm)	
Type of cooling system	**Standard**	**Energy recovery**
Single pass	< 10	< 1
Recirculating (with tower)	< 10	not applicable
Closed loop	< 10	< 1

12. **Oil or grease**
 < **1 ppm** (rejection value)
13. **Biology**
 If biology is present, it must be aerobic. Anaerobic biology (in closed systems) must be avoided.

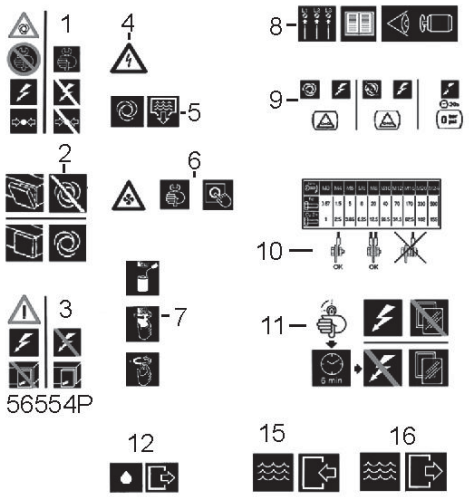
	Biology (CFU/ml)	
Type of cooling system	**Standard**	**Energy recovery**
Single pass	< 10^5 / **< 10^7**	< 10^3 / **< 10^5**
Recirculating (with tower)	< 10^5 / **< 10^7**	not applicable
Closed loop	< 10^3 / **< 10^5**	< 10^3 / **< 10^5**

The table shows the recommended values. The values in **bold** are rejection limits.



If additives are used in the cooling water, take into account that the cooling capacity will change.
$\Delta m = ((C_{pw} - C_{pa}) * X) / (C_{pw} *(1-X) + X*C_{pa}) * 100\ \%$
with
Δm: change of mass flow of the coolant
C_{pw}: specific heat capacity of water
C_{pa}: specific heat capacity of the additives
X: the percentage of additives

7.5 Pictographs



Pictographs

Reference	Designation
1	Switch off the voltage and depressurize the compressor before starting maintenance or repairs
2	Keep the doors closed during operation
3	Switch off the voltage before removing protecting cover inside electric cubicle
4	Warning, voltage
5	Automatic condensate drain
6	Stop the compressor before cleaning the coolers
7	Lightly oil the gasket of the oil filter, screw it on and tighten by hand (approx. half a turn)
8	Before connecting the compressor electrically, consult the Instruction book for the motor rotation direction
9	Compressor remains pressurized for 180 seconds after switching off the voltage
10	Torques for steel (Fe) or brass (CuZn) bolts
11	Switch off the voltage and wait at least 6 minutes before removing the screen
12	Oil outlet (option DD/PD filters)

Pictographs on water-cooled compressors

Reference	Designation
15	Cooling water inlet
16	Cooling water outlet

8 Operating instructions

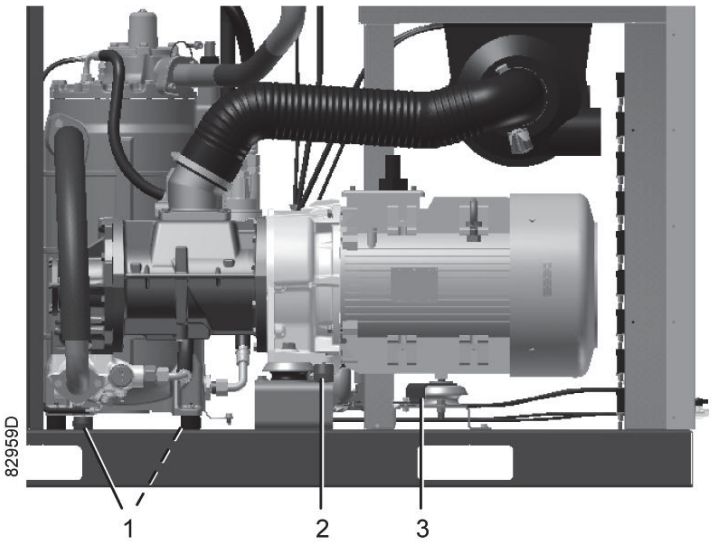
8.1 Initial start-up

Safety

	The operator must apply all relevant Safety precautions. Also consult section Problem solving.
	For the location of the air outlet valve and the drain connections, see sections Introduction and Condensate system.

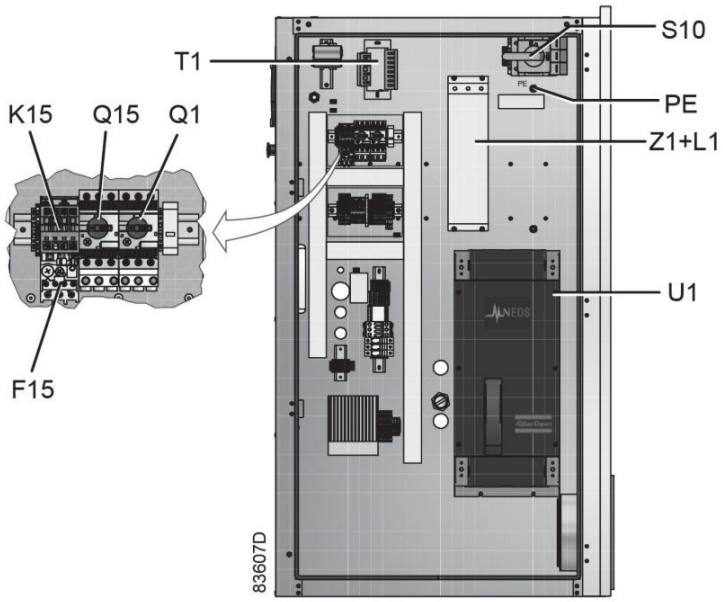
Preparations

1. Consult the sections Electrical cable size, Installation proposal and Dimension drawings.
2. **The following transport fixtures, painted red, must be removed:**
 - Bolts and bushes under the oil separator vessel (1)
 - Bolts and bushes under the gear casing (2)
 - Supports under motor (3)



Transport fixtures of GA 37 VSD and GA 45 VSD

3. Check that the electrical connections correspond to the local codes and that all wires are clamped tight to their terminals.
 The installation must be earthed and protected against short circuits by fuses of the inert type in all phases.
 An isolating switch must be installed near the compressor.
4. On air-cooled compressors, check the setting of circuit breaker (Q15). Also check that the switch on the circuit breaker is in position I.
5. Check the voltage selecting wires at the primary side of transformer T1.



Electric cabinet of GA 37 VSD and GA 45 VSD, typical example

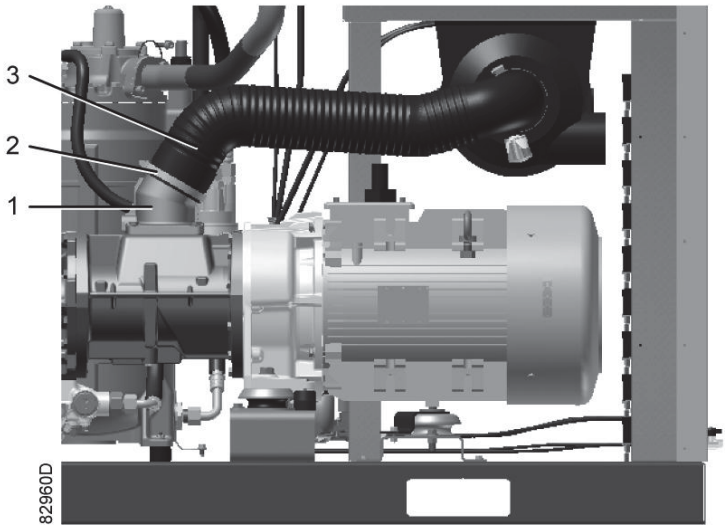
6. Fit air outlet valve (AV); see section Introduction for the position of the valve.
 Close the valve.
 Connect the air net to the valve.
 On compressors equipped with a dryer bypass, fit the air outlet valve to the dryer bypass pipe.
7. Connect the condensate drain outlet(s) to a drain collector. See section Condensate system and in case of an OSCi see section Putting into operation OSCi.
 For Full-Feature units: also connect the condensate drain outlet of the dryer to a drain collector.
 The drain pipes to the drain collector must not dip into the water. For draining of pure condensate water, install an oil/water separator which is available from Atlas Copco as an option. See section Introduction OSCi. If the pipes have been fitted outside the room where freezing is possible, they must be insulated.
8. For compressors with a DD or a DD and PD filter: connect the automatic drain of the filters to a suitable drain collector.
9. On water-cooled compressors, drain valves, shut-off valves and a regulating valve should be fitted by the customer in the cooling water piping.
10. **Provide labels, warning the operator that:**
 - The compressor may automatically restart after voltage failure (if activated, consult Atlas Copco).
 - The compressor is automatically controlled and may be restarted automatically.
 - The compressor may be remotely controlled.

Initial start procedure

If the compressor has not run for the past 6 months, it is strongly recommended to improve the lubrication of the compressor element before starting.
To do so:

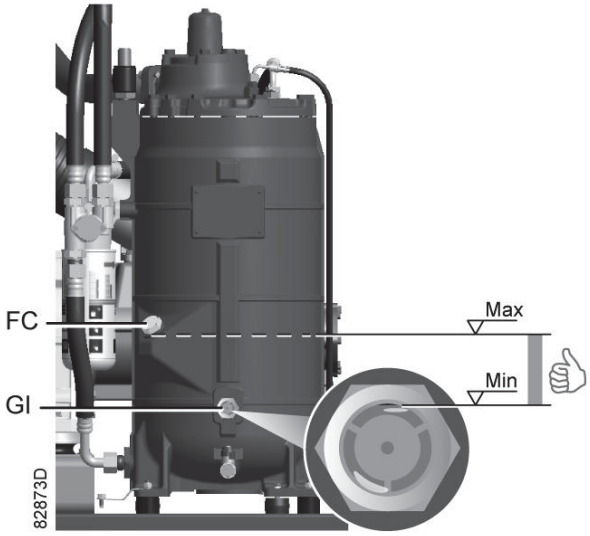
1. Loosen the hose clip (2) and disconnect the inlet hose (3).
2. Remove the unloader (1)
3. Pour 0.75 l (0.20 US gal, 0.17 Imp gal) of compressor oil into the inlet arrestor (1). For oil specifications, see section Oil specifications.
4. Reinstall the inlet hose.

Make sure that all connections are tight.



Position of arrestor on GA 37 VSD and GA 45 VSD

1. Check the oil level.
 The oil level should be between the oil filler neck (FC) and the top in the sight glass (Gl).

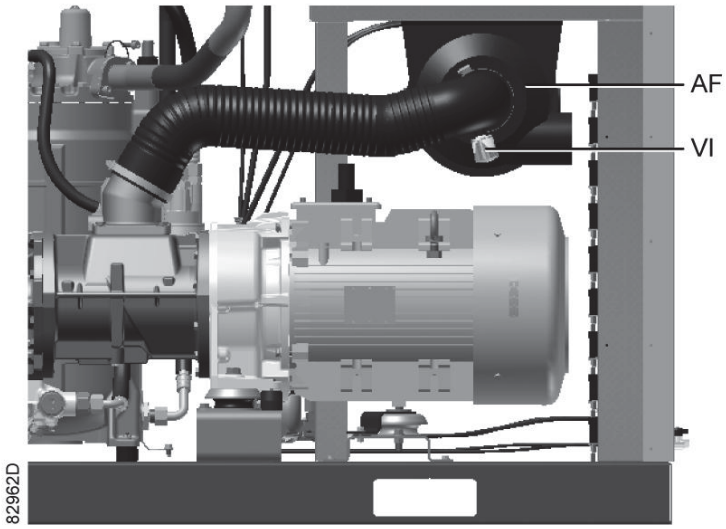


2. On water-cooled compressors, close the cooling water drain valves. Open the cooling water inlet valve and the regulation valve.
3. Switch on the voltage.
 On Full-Feature compressors: switch on the voltage and actuate contactor K12 (dryer fan) on the dryer rail for a few seconds (e.g. by means of a screw driver) to check for the rotation direction. The rotation direction of the fan is indicative for the rotation direction of the dryer compressor. If the direction is wrong, interchange two phases of the mains supply.
 The dryer will become damaged when operating in the wrong direction!
4. On air-cooled compressors, check the rotation direction of the fan motor. Rotation arrows, visible through the grating in the roof, are provided on the plate below the fan to indicate the correct rotation direction of the fan motor.
5. Check the programmed settings. Consult section Programmable settings.
6. Start and run the compressor for a few minutes. Check that the compressor operates normally.

8.2 Before starting

Procedure

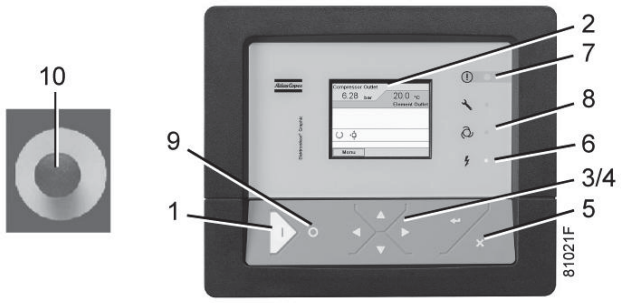
1. If the compressor has not run for the past 6 months, it is strongly recommended to improve the lubrication of the compressor element before starting. See section Initial start.
2. Check the oil level. Top up if necessary. See section Initial start.
3. If necessary, empty the dust trap of the filter; see section Air filter.
 If the red part of the air filter service indicator shows full out, replace the air filter element. Reset the service indicator (VI) by pushing the knob in the extremity of the indicator.



4. On water-cooled compressors, also:
 - Check that the cooling water drain valves in the inlet and outlet pipes are closed.
 - Open the cooling water inlet valve.
 - Open the water flow regulating valve. This step can be skipped if the setting of this valve has not been changed.

8.3 Starting

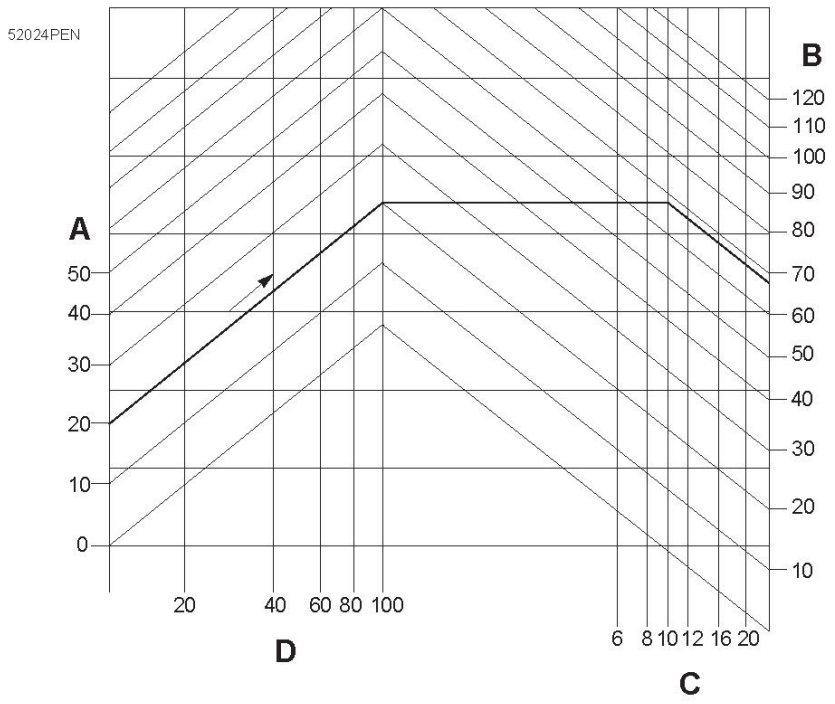
	For the position of the air outlet valve and the drain connections, see sections Introduction and Condensate system.



Control panel Elektronikon® Graphic

Procedure

1. Open the air outlet valve.
2. Switch on the voltage. Check that voltage on LED (6) lights up.
3. Press start button (1) on the control panel. The compressor starts running and the automatic operation LED (8) lights up. Ten seconds after starting, the drive motor switches over from star to delta and the compressor starts running loaded.
4. On water-cooled compressors, the cooling water is used to cool the compressor oil and compressed air. Regulate the cooling water flow during loaded operation to obtain the most suitable temperature at the outlet of the compressor element. This temperature is determined by the condensation point of water at operating conditions (lower temperature limit) and the maximum desirable oil temperature (100 °C / 212 °F) as upper limit. For good practice, regulate the cooling flow to obtain an element outlet temperature approximately 5° C above the relevant (lower limit) temperature obtained from the figure below. If the calculated temperature is higher than 100° C, this will lead to more rapid oil deterioration, which will have an impact on oil service intervals. Consult Atlas Copco for best practices in this case. Also consult Atlas Copco in case condensate should form in the oil.
 For optimal operation, the cooling water outlet temperature must never exceed the value specified in section Reference conditions and limitations.



Minimum compressor element outlet temperature for water-cooled units

A	Air inlet temperature (°C)
B	Condensation temperature (°C)
C	Working pressure (bar(e))
D	Relative air humidity (%)

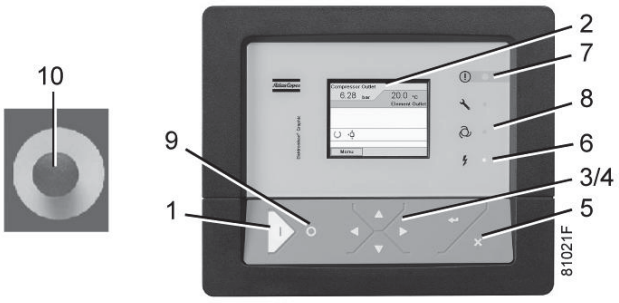
Example: If operating at a pressure of 10 bar(e) (145 psig) in an ambient temperature of 20 ˚C (68 ˚F) and at a relative air humidity of 100 %, the minimum temperature to prevent condensation formation in the oil is 68 ˚C (154 ˚F). Regulate the cooling water flow during loaded operation to obtain a temperature between 70 °C (158 °F) and 75 ˚C (167 ˚F) at the outlet of the compressor element.

8.4 During operation

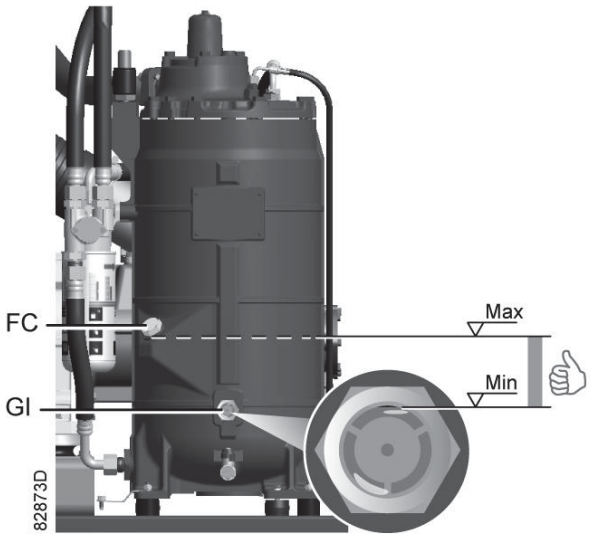
Warnings

	The operator must apply all relevant Safety precautions. Also consult section Problem solving.
	Keep the doors closed during operation. They may be opened for short periods only to carry out checks.
	When the motors are stopped and LED (8) (automatic operation) is alight, the motors may start automatically.

Checking the oil level



Control panel Elektronikon® Graphic



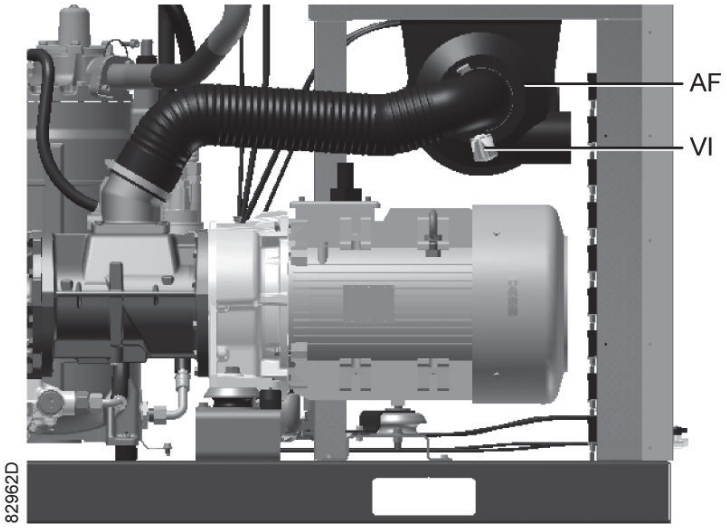
Regularly check the oil level. To do so:

1. Press stop button (9).
2. A few minutes after stopping, the oil level should be between the oil filler neck (FC) and the top of the sight glass (Gl).
3. If the oil level is too low, push the emergency stop button (10) to avoid the compressor to start unexpectedly.
4. Next, close the air outlet valve and open the manual drain valve (Dm) until the air system between oil separator/air receiver vessel and outlet valve is fully depressurized. See section Condensate system for location of the outlet valve and water drain.
5. Unscrew oil filler plug (FC) one turn to permit any pressure left in the system to escape. Wait a few minutes.
6. Remove the plug and add oil until the level reaches the filler opening.
7. Fit and tighten the plug (FC).

.

On compressors with an Elektronikon® Graphic controller, unlock the emergency stop button (10), select the STOP icon on the display and press reset (5) before restarting.

Air filter



Position of the service indicator

Regularly check the service indicator. If the colored part of service indicator (VI) shows full out, replace the air filter element. Reset the service indicator by pushing the knob in the extremity of the indicator body.

Drains

Regularly check that condensate is discharged during operation. See section Condensate system. The amount of condensate depends on environmental and working conditions.

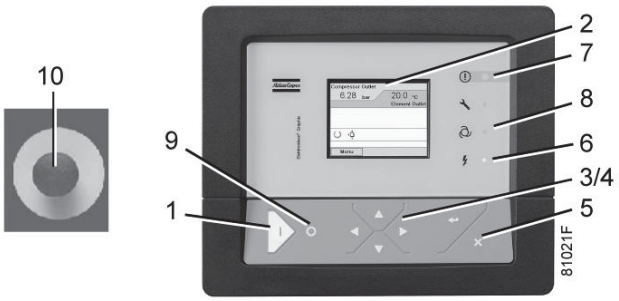
If an OSCi is installed, also check the level in the oil collector. See section Maintenance OSCi.

Cooling water flow

On water-cooled compressors, check regularly the cooling water flow, as indicated in section Starting.

8.5 Checking the display

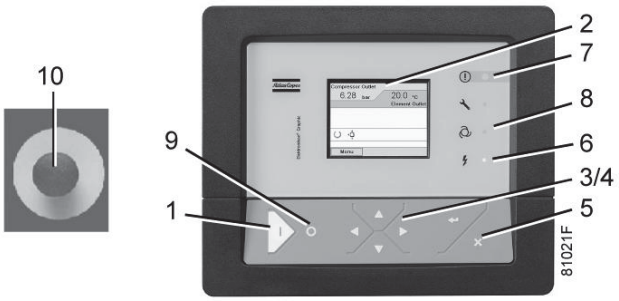
Compressors with Elektronikon® Graphic controller:



Control panel of the Elektronikon® Graphic controller

Check the display (2) regularly for readings and messages. The display normally shows the compressor outlet pressure, while the status of the compressor is indicated by means of a number of icons. Remedy the trouble if alarm LED (7) is lit or flashes, see section Icons used. The display (2) will show a service message if a service plan interval has been exceeded or if a service level for a monitored component has been exceeded. Carry out the service actions of the indicated plans or replace the component and reset the relevant timer, see section Service menu.

8.6 Stopping



Control panel Elektronikon® Graphic

Procedure

Step	Action
-	Press stop button (9). Automatic operation LED (8) goes out and the compressor stops after 30 seconds of unloaded operation.
-	**To stop the compressor in the event of an emergency**, press emergency stop button (10). Alarm LED flashes (7). On compressors with an Elektronikon® Graphic controller: • Remedy the problem cause and unlock the button by pulling it out. • Navigate to the Stop icon on the display by means of the navigation keys (3/4) and press the Select key. Press Reset. **Do not use emergency stop button (10) for normal stopping!**
-	Close the air outlet valve.
-	Press the test button on top of the electronic water drain(s) (if supplied) to the depressurize the piping between air receiver and outlet valve, next open the manual drain valve (Dm). See section Condensate system. Switch off the voltage.
-	**On water-cooled compressors:** • Close the cooling water inlet valve. • If freezing temperatures can be expected, drain the cooling system completely.

8.7 Taking out of operation

Warning

	The operator must apply all relevant Safety precautions.

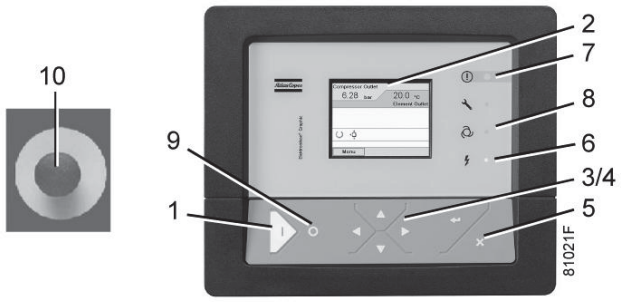
Procedure

Step	Action
-	Stop the compressor and close the air outlet valve.
-	Press the test button on top of the electronic water drain(s) until the air system between air receiver and outlet valve is fully depressurized. Consult section Condensate system to locate the drain valve.
-	Switch off the voltage and disconnect the compressor from the mains.
-	Unscrew the oil filler plug only one turn to permit any pressure in the system to escape. Consult section Oil and oil filter change to locate the filler plug.
-	Shut off and depressurise the part of the air net which is connected to the outlet valve. Disconnect the compressor air outlet pipe from the air net.
-	**On water-cooled compressors:** • Isolate and disconnect the water system from the cooling water net. • Drain the water circuit.
-	Drain the oil.
-	Drain the condensate circuit and disconnect the condensate piping from the condensate net.

9 Maintenance

9.1 Preventive maintenance schedule

Warning



Control panel

	Always apply all relevant Safety precautions. **Before carrying out any maintenance, repair work or adjustments, do as follows:** • Stop the compressor. • Close the air outlet valve and press the test button on top of the electronic water drain(s) until the air system between air receiver and outlet valve is fully depressurized. • Press the emergency stop button (10). • Switch off the voltage. Open and lock the isolating switch. • Depressurize the compressor by opening the oil filler plug one turn.

Before electrical maintenance

	• Wait for at least 10 minutes before starting any electrical repairs as dangerous high voltage remains on the capacitors of the start and speed regulation unit during some minutes after switching off the voltage. • Always switch off the voltage. Only pressing the emergency stop button is not sufficient to make the compressor voltage free. • If the machine is equipped with an automatic restart after voltage failure function and if this function is active, be aware that the machine will restart automatically when the power is restored if it was running when the power was interrupted.

Warranty - Product Liability

Use only authorised parts. Any damage or malfunction caused by the use of unauthorised parts is not covered by Warranty or Product Liability.

Service kits

For overhauling or carrying out preventive maintenance, service kits are available (see section Service kits).

Service contracts

Atlas Copco offers several types of service contracts, relieving you of all preventive maintenance work. Consult your Atlas Copco Customer Centre.

General

When servicing, replace all removed O-rings and washers.

Intervals

The local Atlas Copco Customer Centre may overrule the maintenance schedule, especially the service intervals, depending on the environmental and working conditions of the compressor.

The longer interval checks must also include the shorter interval checks.

Service interventions

Following actions have to be done on a regular basis:

Maintenance checklist

Period	Operation
Daily	Check oil level. Check readings on display. Check air filter service indicator. Check that condensate is discharged during operation. Drain condensate. On water-cooled units: check for cooling water flow.
Monthly	Check that condensate is discharged when pressing the test button on top of the electronic water drain. On compressors with integrated dryer: • Stop the compressor, close the air outlet valve and switch off the voltage. • Remove any dirt from the condenser inlet with a vacuum cleaner. • Next, clean with an air jet in the reverse direction of the normal flow. Use low pressure air. Keep the compressed air nozzle more than 30 cm away from the condenser to avoid damaging the of condenser fins. • Remove dust from inside the dryer, e.g. with a vacuum cleaner. Do not use water or solvents to clean the condenser.
3-monthly (1)	Check coolers, clean if necessary. Remove the air filter element and inspect. If necessary, clean using an air jet. Replace damaged or heavily contaminated elements. Check the filter element of the electric cabinet. Replace if necessary
Yearly or every 8000 hours (2)	Replace the wearing parts of the electronic water drain(s). A service kit is available. Have the safety valve tested.

(1): More frequently when operating in a dusty atmosphere

(2): Whichever comes first

Apart from the above mentioned actions, the service interventions in the table below are programmed in the memory of the Elektronikon® controller. Each plan has a programmed time interval at which all service actions belonging to that plan are to be carried out. When reaching the interval, a message will appear on the screen indicating which service plans are to be carried out. See section Service menu. After servicing, the intervals must be reset. See section Service menu.

Preventive Maintenance schedule programmed in the Elektronikon®

Running hours	Operation
4000 (1)	If Atlas Copco Roto-Foodgrade Fluid is used, change oil and oil filter. If Atlas Copco Roto-Inject Fluid is used, change oil and oil filter. Replace the air filter element. Replace the filter element of the electric cabinet. Check condition of the air intake hose between air filter and compressor element (where applicable). Check pressure and temperature readings. Do a LED and display test. Test the temperature shut-down function. On air-cooled compressors: clean coolers. Check and clean cooling fan assembly. Clean cooling fins of electric motors. Inspect the restriction nozzle in the scavenging line for cleanness. Check operation of cooling fans of converter. Check blow-off solenoid valve after stopping and pressing the emergency stop button. On water-cooled units: check for possible water leakage.
8000 (2)	If Atlas Copco Roto-Xtend Duty Fluid is used, change oil and oil filter. Have the oil separator element replaced. The oil separator element must also be replaced when the pressure drop over it exceeds 1 bar (14.5 psi). Check the pressure drop while the compressor is running loaded and preferably with a stable working pressure. Visually inspect the oil separator vessel for damage and corrosion. The minimum wall thickness must be respected. See section Pressure equipment directives.

(1): or when the real time counter indicates the service plan, whichever comes first

(2): or when the real time counter indicates the service plan, whichever comes first

The indicated oil exchange intervals are valid for standard operating conditions (see section Reference conditions and limitations) and nominal operating pressure (see section Compressor data). Exposure of the compressor to external pollutants, operation at high humidity combined with low duty cycles or operation at higher temperatures may require a shorter oil exchange interval. Contact Atlas Copco if in doubt.

	• Consult Atlas Copco before modifying a timer setting. • For the change interval of oil and oil filter in extreme conditions consult your Atlas Copco Customer Centre. • Any leakage should be attended to immediately. Damaged hoses or flexible joints must be replaced.

9.2 Oil specifications

It is strongly recommended to use genuine Atlas Copco Lubricants. They are the result of years of field experience and research. See section Preventive maintenance schedule for the advised replacement intervals and consult the Spare Parts list for part number information.

	Avoid mixing lubricants of different brands or types as they may not be compatible and the oil mix may have inferior properties. A label, indicating the type of oil filled ex factory, is stuck on the air receiver/oil tank.

Roto-Inject Fluid

Atlas Copco's Roto-Inject Fluid is a specially developed lubricant for use in single stage oil-injected screw compressors. Its specific composition keeps the compressor in excellent condition. Roto-Inject Fluid can be used for compressors operating at ambient temperatures between 0 ˚C (32 ˚F) and 40 ˚C (104 ˚F). If the compressor is regularly operating in ambient temperatures above 35 °C (95 °F), oil lifetime is reduced significantly. In such case it is recommended to use Roto-Xtend Duty Fluid.

Roto-Xtend Duty Fluid

Atlas Copco's Roto-Xtend Duty Fluid is a high quality synthetic lubricant for oil-injected screw compressors which keeps the compressor in excellent condition. Because of its excellent oxidation stability, Roto-Xtend Duty Fluid can be used for compressors operating at ambient temperatures between 0 ˚C (32 ˚F) and 46 ˚C (115 ˚F).

Roto-Xtend Duty Fluid is the standard oil for compressors equipped with freeze protection.

Roto-Foodgrade Fluid

Special oil, delivered as an option.

Atlas Copco's Roto-Foodgrade Fluid is a unique high quality synthetic lubricant, specially created for oil-injected screw compressors that provide air for the food industry. This lubricant keeps the compressor in excellent condition. Roto-Foodgrade Fluid can be used for compressors operating at ambient temperatures between 0 ˚C (32 ˚F) and 40 ˚C (104 ˚F).

9.3 Drive motor

General

Keep the outside of the electric motor clean for efficient cooling. If necessary, remove dust with a brush and/or compressed air jet.

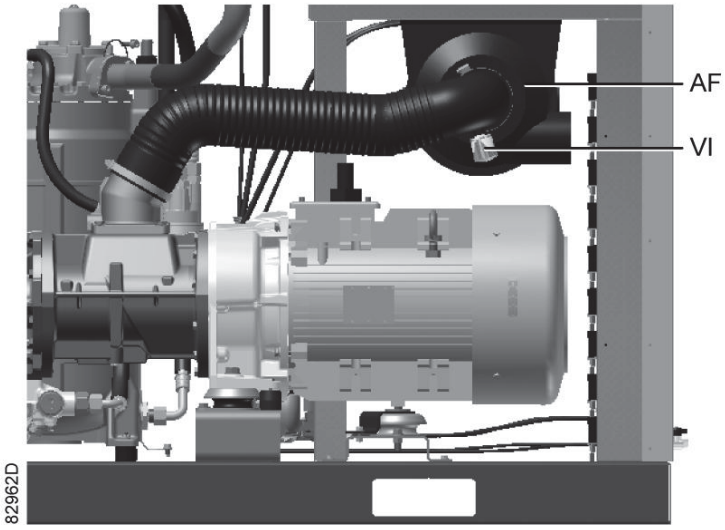
Bearing maintenance

The bearing at the non-drive end side is greased for life.

The bearing at the drive end side is lubricated by the oil system.

9.4 Air filter

Location of air filter



Recommendations

1. Never remove the element while the compressor is running.
2. For minimum downtime, replace the dirty element by a new one.
3. Discard the element when damaged.

Procedure

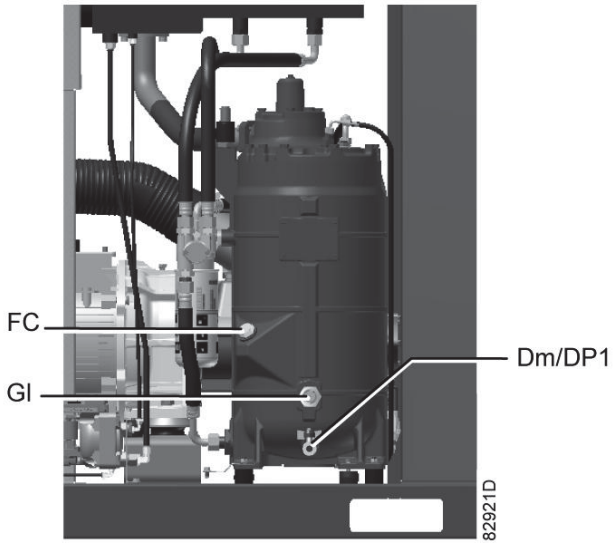
1. Stop the compressor. Switch off the voltage.
2. Release the snap clips of air filter (AF) and remove the cover and the air filter element. Discard the filter element.
3. Fit the new element and the cover.
4. Reset service indicator (VI) by pushing the knob in the extremity of the body.
5. Reset the air filter service warning.
 For compressors equipped with an Elektronikon® Graphic regulator, see section Service menu.

9.5 Oil and oil filter change

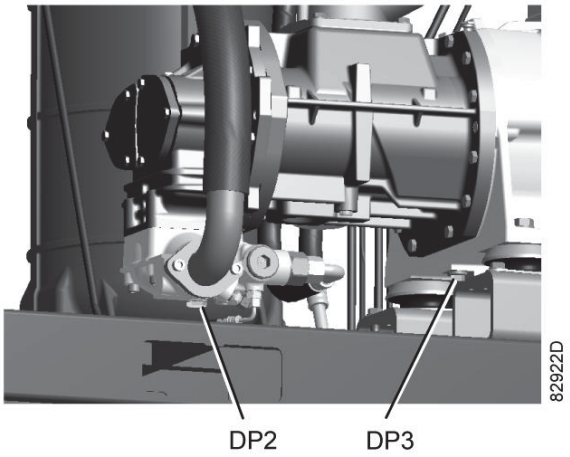
Warning

⚠	The operator must apply all relevant Safety precautions. Always drain the compressor oil at all drain points. Used oil left in the compressor can contaminate the oil system and can shorten the lifetime of the new oil. Never mix lubricants of different brands or types as they may not be compatible and the oil mix will have inferior properties. A label, indicating the type of oil filled ex-factory, is stuck on the air receiver/oil tank. If the compressor is equipped with an Energy Recovery system, also consult Maintenance for Energy Recovery Systems.

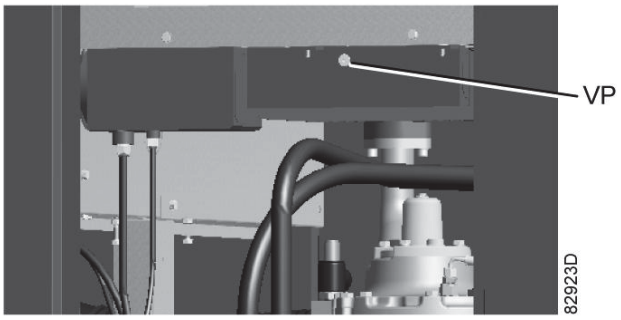
Procedure



Oil drain and filler plug on the oil separator vessel



Oil drain plugs, check valve and gear casing



Vent plug, oil cooler

Step	Description
-	Run the compressor until warm. Stop the compressor after 3 minutes of unloaded operation. Close the air outlet valve and switch off the voltage. Wait a few minutes and depressurise by unscrewing oil filler plug (FC) just one turn to permit any pressure in the system to escape.
-	Air cooled units: loosen the vent plug (VP) of the oil cooler and wait for 5 minutes.
-	Remove drain plug (DP1) and open drain valve (Dm). Also drain the oil by removing the drain plug: • on the check valve (DP2) • on the gear casing (DP3)
-	Collect the oil in a collector and deliver it to the local collection service. Refit and tighten the drain and vent plugs after draining. Close the drain valve (Dm).
-	Remove the oil filter (OF). **Be aware that this filter has a left thread connection.** Clean the seat on the manifold. Oil the gasket of the new filter and screw it into place. Tighten firmly by hand.
-	Remove filler plug (FC). Fill the air receiver (AR) with oil until the level reaches the filler neck. Take care that no dirt drops into the system. Refit and tighten filler plug (FC).
-	Run the compressor loaded for a few minutes. Stop the compressor and wait a few minutes to allow the oil to settle.
-	Depressurise the system by unscrewing filler plug (FC) just one turn to permit any pressure in the system to escape. Remove the plug. Fill the air receiver with oil until the level reaches the filler neck. Tighten the filler plug.
-	Reset the service warning after carrying out all service actions in the relevant Service Plan: For compressors with Elektronikon® Graphic controller, see section Service menu.

9.6 Coolers

General

Keep the coolers clean to maintain their efficiency.

Instructions for air-cooled compressors

- Stop the compressor, close the air outlet valve and switch off the voltage.

- Cover all parts under the coolers.
- Remove the service plates (1) at the fan compartment.



- Remove any dirt from the coolers with a fibre brush. Brush in the direction of the cooling fins. Also remove any dirt from the fan with a fibre brush.
- Next, clean with an air jet in the reverse direction to normal flow. Use low pressure air. If necessary, the pressure may be increased up to 6 bar(e) (87 psig).
- If it is necessary to wash the coolers with a cleaning agent, consult Atlas Copco.
- Remove the cover used during cleaning.
- Mount the service plates (1) at the fan compartment.

Instructions for compressors with dryer.

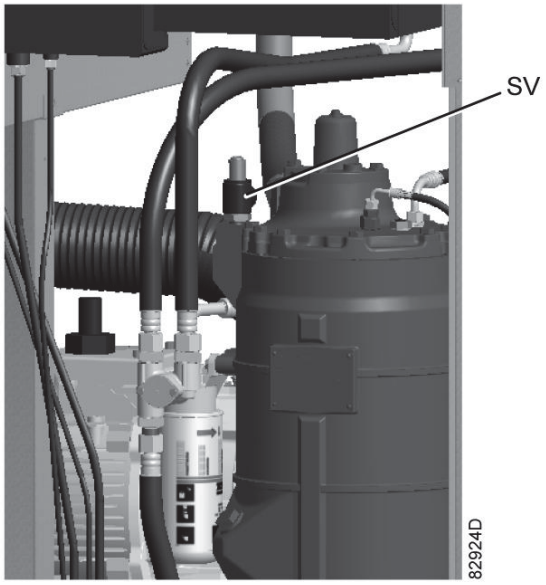
- Stop the compressor, close the air outlet valve and switch off the voltage.
- Remove any dirt on the condenser inlet with a vacuum cleaner.
- Next, clean with an air jet in the reverse direction to normal flow. Use low pressure air. If necessary, the pressure may be increased up to 6 bar(e) (87 psig).
- Clean the condenser area with a vacuum cleaner.

Instructions for water-cooled compressors

Consult Atlas Copco.

9.7 Safety valves

Location of safety valve



Position of safety valve

Operating

Operate the safety valve by unscrewing the cap one or two turns and retighten it.

Testing

Before removing the valve, depressurise the compressor.

See section Problem solving.

Valve (SV) can be tested on a separate air line. If the valve does not open at the set pressure stamped on the valve, it needs to be replaced.

Warning

No adjustments are allowed. Never run the compressor without safety valve.

9.8 Dryer maintenance instructions

Safety precautions

Refrigeration dryers of ID type contain refrigerant HFC.

When handling refrigerant, all applicable safety precautions must be observed. Please be specifically aware of the following points:

- Contact of refrigerant with the skin will cause freezing. Special gloves must be worn. If contacted with the skin, the skin should be rinsed with water. On no account may clothing be removed.
- Fluid refrigerant will also cause freezing of the eyes; always wear safety glasses.
- Refrigerant is harmful. Do not inhale refrigerant vapours. Check that the working area is adequately ventilated.

Be aware that certain components such as the refrigerant compressor and the discharge pipe can become quite hot (up to 110 °C - 230 °F). Therefore, wait until the dryer has cooled down before removing the panels.

Before starting any maintenance or repair work, switch off the voltage and close the air inlet and outlet valves.

Local legislation

Local legislation may stipulate that:

- Work on the refrigerant circuit of the cooling dryer or on any equipment which influences its function must be undertaken by an authorised control body.
- The installation should be checked once a year by an authorised control body.

General

For all references see section Introduction.

The following remarks should be kept in mind:

- Keep the dryer clean.
- Brush or blow off the finned surface of condenser monthly.
- Inspect and clean the electronic condensate drain monthly.

9.9 Service kits

Service kits

For overhauling and for preventive maintenance, a wide range of service kits is available. Service kits comprise all parts required for servicing the component and offer the benefits of genuine Atlas Copco parts while keeping the maintenance budget low.

Also a full range of extensively tested lubricants, suitable for your specific needs is available to keep the compressor in excellent condition.

Consult the Spare Parts List for part numbers.

9.10 Storage after installation

Procedure

Run the compressor regularly, e.g. twice a week, until warm. Load and unload the compressor a few times.

	If the compressor is going to be stored without running from time to time, protective measures must be taken. Consult your supplier.

9.11 Disposal of used material

Used filters or any other used material (e.g. desiccant, lubricants, cleaning rags, machine parts, etc.) must be disposed of in an environmentally friendly and safe manner, and in line with the local recommendations and environmental legislation.

Electronic components are subject to the EU Directive 2002/96/EC for Waste Electrical and Electronic Equipment (WEEE). As such, these parts must not be disposed of at a municipal waste collection point. Refer to local regulations for directions on how to dispose of this product in an environmental friendly manner.

10 Problem solving

Warning

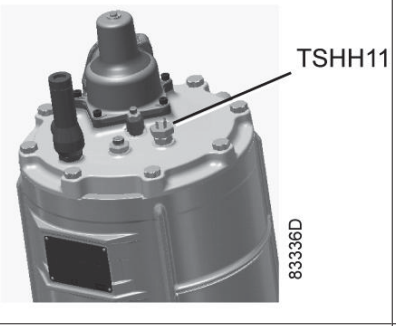
	Always apply all relevant Safety precautions.
	Before carrying out any maintenance, repair work or adjustment, press the stop button, wait until the compressor has stopped and close the air outlet valve. Open the manual drain valve(s). Press the emergency stop button and switch off the voltage. Open and lock the isolating switch. Depressurise the compressor by opening the oil filler plug one turn. For location of components: see sectionsIntroduction, Condensate system and Initial start.
	The air outlet valve can be locked during maintenance or repair as follows: • Close the valve. • Remove the screw fixing the handle with the wrench delivered with the compressor. • Lift the handle and turn it until the slot of the handle fits over the blocking edge on the valve body. • Fit the screw.

Before electrical maintenance

	• Wait for at least 10 minutes before starting any electrical repairs as dangerous high voltage remains on the capacitors of the start and speed regulation unit during some minutes after switching off the voltage. • Always switch off the voltage. Only pressing the emergency stop button is not sufficient to make the compressor voltage free. • If the machine is equipped with an automatic restart after voltage failure function and if this function is active, be aware that the machine will restart automatically when the power is restored if it was running when the power was interrupted.

Faults and remedies, compressor

On compressors equipped with an Elektronikon® Graphic controller, if the alarm LED is lit or flashes, consult sections Event history menu or Service menu.

Condition	Possible cause	Remedy
Compressor does not start or stops during operation. Elektronikon shows <Main Motor Converter Alarm>.	Too high temperature in oil the separator vessel or temperature switch (TSHH1) defective 	Check switch functionality. Check wiring. Replace if necessary
Condensate is not discharged from condensate separator during loading	Discharge tube clogged	Check and correct as necessary
Compressor air output or pressure below normal	Air consumption exceeds air delivery of compressor	Check the connected equipment.
	Choked air filter element	Replace filter element
	Solenoid valve malfunctioning	Replace valve
	Oil separator element clogged	Have element replaced
	Air leakage	Have leaks repaired. Replace leaking tubes
	Safety valve leaking	Replace valve
	Compressor element out of order	Consult Atlas Copco
Safety valve blows	Minimum pressure valve malfunctioning	Check and have defective parts replaced
	Oil separator element clogged	Have element replaced
	Safety valve out of order	Have valve checked. Replace if necessary
	On Full-Feature compressors, dryer piping clogged due to formation of ice	Have system checked by Atlas Copco Customer Centre
Compressor element outlet temperature or delivery air temperature above normal	Oil level too low	Check and correct
	On air-cooled compressors, insufficient cooling air or cooling air temperature too high	Check for cooling air restriction or improve ventilation of the compressor room. Avoid recirculating of cooling air. If installed, check capacity of compressor room fan
	On water-cooled compressors, cooling water flow too low	Increase flow
	On water-cooled compressors, restriction in cooling water system	Consult Atlas Copco Customer Centre
	Oil cooler clogged	Clean cooler

Condition	Possible cause	Remedy
	Thermostatic valve malfunctioning	Have valve tested. Replace if necessary.
	Air cooler clogged	Clean cooler
	Compressor element out of order	Consult Atlas Copco Customer Centre
Excessive oil consumption; oil carry-over through discharge line	Incorrect oil causing foam	Change to correct oil
	Oil level too high	Check for overfilling. Release pressure and drain oil to correct level.
	Oil separator defective	Replace oil separator element
	Malfunctioning of the scavenge line	Replace non-return valve in the scavenge line

Faults and remedies, dryer

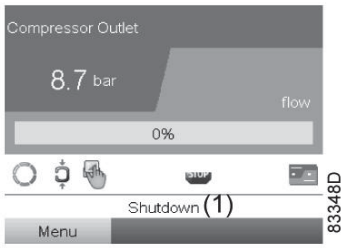
For all references hereafter, consult section Air dryer.

Condition	Fault	Remedy
Pressure dew point too high	Air inlet temperature too high	Check and correct; if necessary, clean the aftercooler of the compressor
	Ambient temperature too high	Check and correct; if necessary, draw cooling air via a duct from a cooler place or relocate the compressor
	Shortage of refrigerant	Have circuit checked for leaks and recharged
	Refrigerant compressor does not run	See below
	Evaporator pressure too high	See below
	Condenser pressure too high	See below
Condenser pressure too high or too low	Fan control switch out of order	Replace
	Fan blades or fan motor out of order	Have checked fan/fan motor, if necessary replace.
	Ambient temperature too high	Check and correct; if necessary, draw cooling air via a duct from a cooler place or relocate the compressor
	Condenser externally clogged	Clean condenser
Compressor stops or does not start	Electric power supply to compressor is interrupted	Check and correct as necessary
	Thermal protection of refrigerant compressor motor has tripped	Motor will restart when motor windings have cooled down
Electronic condensate drain remains inoperative	Electronic drain system clogged	Have system inspected Clean the filter of the automatic drain by opening the manual drain valve. Check functioning of the drain by pushing the test button.

Condition	Fault	Remedy
Condensate trap continuously discharges air and water	Automatic drain out of order	Have system checked. If necessary, replace the automatic drain.
Evaporator pressure is too high or too low at unload	Hot gas bypass valve incorrectly set or out of order	Have hot gas bypass valve adjusted
	Condenser pressure too high or too low	See above
	Shortage of refrigerant	Have circuit checked for leaks and recharged if necessary

Converter fault codes

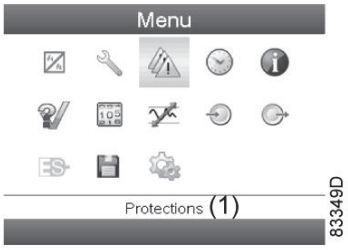
If a problem is detected by the converter, a specific code (Main motor converter alarm) will appear on the Elektronikon display, together with a fault code.



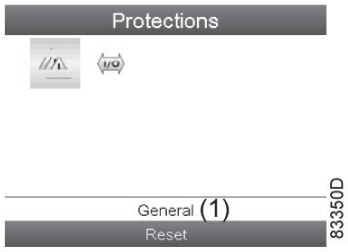
Typical display when the compressor is stopped by a shutdown

(1)	Shutdown

Navigate to the Stop icon or to the Protections icon and press Enter.

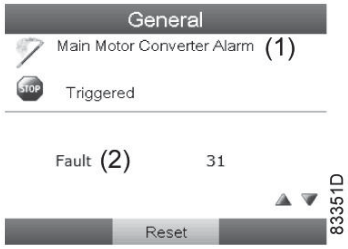


(1)	Protections



(1)	General

The display shows the problem (Main Motor Converter Alarm) and a fault code (31 in this case).

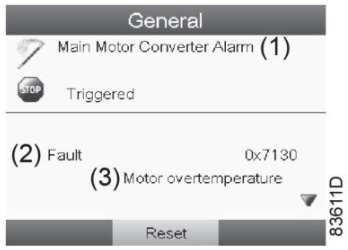


(1)	Main Motor Converter Alarm
(2)	Fault

Below table lists the most important error codes. If another code appears, please contact Atlas Copco.

Neos

If a problem is detected by the Neos converter, a specific code (Main motor converter alarm) will appear on the Elektronikon display, together with a fault code and a fault description.



Typical display, Main Motor Converter Alarm (1) , Fault (2) Code (0x7130) and description (Motor overtemperature (3)) in this case.

Below table lists the most important error codes. If another code appears, please contact Atlas Copco.

Fault code	Fault description	Cause	Actions
0x1111	Undervoltage	Main Power supply voltage too low or missing links in the control panel	Check if main supply voltage is within specs. Check main fuses. Check for loose connectors at the control unit of the converter and Elektronikon. Check for tripped fuses at the secondary of the transformer T1 in the electrical panel.
0x2312	Motor overcurrent	Overcurrent detected at motor side	Check if main supply voltage is within specs.
0x2314			

Fault code	Fault description	Cause	Actions
0x2315	Motor overcurrent	Short Circuit detected in U phase	Try to reset the error. If error returns, contact Atlas Copco.
0x2316	Motor overcurrent	Short Circuit detected in V phase	
0x2317	Motor overcurrent	Short Circuit detected in W phase	
0x3210	Overvoltage	Overvoltage detected	Check if main supply voltage is within specs. Check main fuses.
0x3221	Undervoltage	Main Power supply voltage too low.	
0x3223	Undervoltage	Phase loss detected	
0x3224	Overvoltage	Maximum allowable voltage of the DC-link exceeded; Threshold is lowered in case of higher temperature	Let drive cool off Check for excessive ambient temperature Clean heatsink with compressed air Clean inlet filter cubicle Ensure proper flow of cooling air in compressor room Check if supply voltage is within specs
0x3225	Undervoltage	Undervoltage detected	Check if main supply voltage is within specs. Check main fuses.
0x3226	Overvoltage	Overvoltage or overtemperature detected in IGBT (U phase)	Let drive cool off. Check for excessive ambient temperature. Clean heatsink with compressed air. Clean inlet filter cubicle. Ensure proper flow of cooling air in compressor room. Check if supply voltage is within specs.
0x3227	Overvoltage	Overvoltage or overtemperature detected in IGBT (V phase)	
0x3228	Overvoltage	Overvoltage or overtemperature detected in IGBT (W phase)	

Fault code	Fault description	Cause	Actions
0x4311	Drive overtemperature	Overtemperature detected in an IGBT	Let drive cool off. Check for excessive ambient temperature. Clean heatsink with compressed air. Clean inlet filter cubicle. Ensure proper flow of cooling air in compressor room.
0x4312	Drive overtemperature	Overtemperature detected in the heatsink	
0x4314	Drive overtemperature	Overtemperature detected in IGBT junction UH	
0x4315	Drive overtemperature	Overtemperature detected in IGBT junction UL	
0x4316	Drive overtemperature	Overtemperature detected in IGBT junction VH	
0x4317	Drive overtemperature	Overtemperature detected in IGBT junction VL	
0x4318	Drive overtemperature	Overtemperature detected in IGBT junction WH	
0x4319	Drive overtemperature	Overtemperature detected in IGBT junction WL	
0x4320	Drive overtemperature	Overtemperature detected in powerboard	
0x4321	Drive overtemperature	Overtemperature detected in control board	
0x4322	Drive overtemperature	Overtemperature detected in IGBT board U phase	
0x4323	Drive overtemperature	Overtemperature detected in IGBT board V phase	
0x4324	Drive overtemperature	Overtemperature detected in IGBT board W phase	
0x5020	Emergency off (STO)	Emergency stop circuit opened	Check emergency stop button. Check for loose connectors at the control unit of the converter.
0x5021	Emergency off (STO)	Emergency stop circuit opened	
0x5022	Emergency off (STO)	Emergency stop circuit opened Hardware fault detected	

Fault code	Fault description	Cause	Actions
0x5114	Drive failure (hardware)	Internal power supply tripped	Try to reset the error. If error returns, contact Atlas Copco.
0x5115	Drive failure (hardware)	Internal power supply tripped	
0x5401	Drive failure (hardware)	General fault detected in power section	
0x5402	Drive failure (hardware)	General fault detected in power section	
0x6101	Drive failure (hardware)	Eeprom read failed Time-out communication	
0x6102	Drive failure (hardware)	Failed temperature reading of power board Time-out communication at initialization	
0x6103	Drive failure (hardware)	General fault detected	
0x6104	Drive failure (hardware)	Internal checksum error detected	
0x6105	Drive failure (hardware)	Internal communication timeout	
0x6106	Drive failure (hardware)	Internal checksum error detected	
0x6107	Drive failure (hardware)	Internal communication timeout	
0x6108	Drive failure (hardware)	Internal communication timeout	
0x6109	Drive failure (hardware)	Internal checksum error detected	
0x610A	Drive failure (hardware)	Internal communication overload	
0x610B	Drive failure (hardware)	Internal control overload	
0x610C	Drive failure (hardware)	CAN communication time-out	Check CAN-cable connection between Elektronikon and converter. Check position of the CAN termination switch at both sides of the CAN cable. Both should be OFF.
0x610D	Drive failure (hardware)	Firmware not compatible	Try to reset the error. If error returns, contact Atlas Copco.
0x610E	Drive failure (hardware)	Not able to identify power board	
0x610F	Drive failure (hardware)	Not able to identify IGBT module	
0x6110	Drive failure (hardware)	Power board not compatible with IGBT modules	

Fault code	Fault description	Cause	Actions
0x6111	Drive failure (software)	Internal CAN state machine fault	Check CAN-cable connection between Elektronikon and converter. Check position of the CAN termination switch at both sides of the CAN cable. Both should be OFF.
0x6112	Drive failure (software)	Requested command cannot be executed because of limited access level	Try to reset the error. If error returns, contact Atlas Copco.
0x6113	Drive failure (software)	CAN communication overload	Check CAN-cable connection between Elektronikon and converter. Check position of the CAN termination switch at both sides of the CAN cable. Both should be OFF.
0x6114	Drive failure (software)	The firmware version is not compatible with the parameter version	Try to reset the error. If error returns, contact Atlas Copco.
0x7130	Motor overtemperature	Motor overtemperature detected	Let motor cool off. Ensure main fan and air flow in and out compressor is not obstructed. Ensure proper flow of cool air in compressor room. Check for loose connectors at the control unit of the converter.
0x8401	Overvoltage	Motor maximum speed exceeded	Try to reset the error. If error returns, contact Atlas Copco.
0x8402	Overvoltage	Motor startup unsuccessful; requested speed not reached	Wait until the vessel depressurizes by blow off. (by not resetting the fault immediately). If the problem persists, contact Atlas Copco.
0x9001	Hardware run enable missing	Hardware enable signal missing	Check for loose connectors at the control unit of the converter and Elektronikon. Check for tripped fuses at the secondary of the transformer T1 in the electrical panel.
0x9065 to 91F4	Drive failure (software)	Failure on attempt to write parameter Pyyy out of range	Try to reset the error. If error returns, contact Atlas Copco.

Control Technics (Optional)

Fault code	Text on converter display	Cause	Actions
1	UU	Too low voltage. The voltage on the converter is below the specifications.	Check the supply voltage. Contact Atlas Copco.
2	OU	Too high voltage. The voltage on the converter is above the specifications.	Check the supply voltage. Contact Atlas Copco.
3	OI.AC	Too high current. The converter is overloaded.	Contact Atlas Copco.

Fault code	Text on converter display	Cause	Actions
21	O.ht1	Converter overheating (IGBT)	Check the ambient temperature. Check the cubicle cooling. Contact Atlas Copco.
22	O.ht2	Converter overheating (heat sink)	Check the ambient temperature. Check the cubicle cooling. Contact Atlas Copco.
24	th	Motor overheating (thermistor)	Check the ambient temperature. Clean the motor cooling fins. Contact Atlas Copco.
27	O.ht3	Converter overheating (thermal model)	Check the ambient temperature. Check the cubicle cooling. Contact Atlas Copco.
32	PH	High input voltage phase imbalance or input phase loss	Check supply phases. Contact Atlas Copco.
102	O.ht4	Converter overheating (Power module)	Check the ambient temperature. Check the cubicle cooling. Contact Atlas Copco.
(blank)	(blank)	Various	Contact Atlas Copco.

11 Technical data

11.1 Readings on display



Elektronikon® Graphic controller

Important

	The readings mentioned below are valid under the reference conditions (see section Reference conditions and limitations).

Reference	Reading
Air outlet pressure	Depends on the setpoint (desired net pressure).
Compressor element outlet temperature	Approx. 60 ˚C (108 ˚F) above ambient temperature.
Dewpoint temperature (on Full-Feature compressors	Approx. 4 ˚C (39 ˚F).
Cooling water outlet temperature	Approx. 50 ˚C (122 ˚F).

11.2 Electric cable size and fuses

Important



- The voltage on the compressor terminals must not deviate more than 10% of the nominal voltage.
 It is however highly recommended to keep the voltage drop over the supply cables at nominal current below 5% of the nominal voltage (IEC 60204-1).
- If cables are grouped together with other power cables, it may be necessary to use cables of a larger size than those calculated for the standard operating conditions.
- Use the original cable entry. See section Dimension drawings.
 To preserve the protection degree of the electric cubicle and to protect its components from dust from the environment, it is mandatory to use a proper cable gland when connecting the supply cable to the compressor.
- Local regulations remain applicable if they are stricter than the values proposed below.
- Currents are calculated with the full service factor but we suggest to add 10% due to over- and under-voltage.
 Fuses are maximum allowed values calculated for full service factor and 10% over- and under-voltage.
- **Caution**:
 - Always double-check the fuse size versus the calculated cable size. If required, reduce fuse size or enlarge cable size.
 - Cable length should not exceed the maximum length according to IEC60204 table 10

Currents and fuses

IEC approval

Compressor type			I (1)	Max fuse (1)		I (2)	Max fuse (2)	
				gR	gL/gG		gR	gL/gG
	V	Hz	A	A	A	A	A	A
GA 37 VSD	200	50	149.6	-	200	161.6	-	200
GA 37 VSD	230	50	130.1	-	160	142	-	160
GA 37 VSD	400	50	73.4	100	-	77	100	-
GA 37 VSD	500	50	59.9	-	80	63.5	-	80
GA 37 VSD	200	60	149.7	-	200	163.8	-	200
GA 37 VSD	230	60	129.6	-	160	143.7	-	160
GA 37 VSD	380	60	76.8	100	-	81.6	100	-
GA 37 VSD	460	60	63.9	80	-	67.5	80	-

I: current in the supply lines at maximum load and nominal voltage

(1): compressors without integrated dryer

(2): compressors with integrated dryer

Fuse calculations for IEC are done according to 60364-4-43 electrical installations of buildings, part 4: protection for safety- section 43: protection against overcurrent. Fuse sizes are calculated in order to protect the cable against short circuit.

UL/cUL approval

Compressor type			I (1)	Max fuse (1)		I (2)	Max fuse (2)	
				HSJ (3) JJS (4)	K5/ HRC form II		HSJ (3) JJS (4)	K5/ HRC form II
	V	Hz	A	A	A	A	A	A
GA 37 VSD	200	60	149.7	-	175	163.8	-	200
GA 37 VSD	230	60	129.6	-	150	143.7	-	175
GA 37 VSD	460	60	63.9	80	-	67.5	80	-
GA 37 VSD	575	60	52.1	-	60	55.7	-	63

I: current in the supply lines at maximum load and nominal voltage

(1): compressors without integrated dryer

(2): compressors with integrated dryer

(3): fuse type for compressors with Control Technics converter

(4): fuse type for compressors with Neos converter

Fuse calculations for UL/cUL: the indicated fuse size is the maximum fuse size in order to protect the motor against short circuit.

Currents and fuses

IEC approval

Compressor type			I (1)	Max fuse (1)		I (2)	Max fuse (2)	
				gR	gL/gG		gR	gL/gG
	V	Hz	A	A	A	A	A	A
GA 45 VSD	400	50	90.7	100	-	94.3	125	-
GA 45 VSD	500	50	74.0	-	100	77.6	-	100
GA 45 VSD	380	60	96.3	125	-	101.1	125	-
GA 45 VSD	460	60	80.3	100	-	84.4	100	-

I: current in the supply lines at maximum load and nominal voltage

(1): compressors without integrated dryer

(2): compressors with integrated dryer

Fuse calculations for IEC are done according to 60364-4-43 electrical installations of buildings, part 4: protection for safety- section 43: protection against overcurrent. Fuse sizes are calculated in order to protect the cable against short circuit.

UL/cUL approval

Compressor type			I (1)	Max fuse (1)		I (2)	Max fuse (2)	
				HSJ (3) JJS (4)	K5/ HRC form II		HSJ (3) JJS (4)	K5/ HRC form II
	V	Hz	A	A	A	A	A	A
GA 45 VSD	460	60	80.3	100	-	84.4	100	-
GA 45 VSD	575	60	65.6	-	80	69.6	-	80

I: current in the supply lines at maximum load and nominal voltage

(1): compressors without integrated dryer

(2): compressors with integrated dryer

(3): fuse type for compressors with Control Technics converter

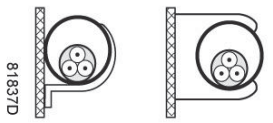
(4): fuse type for compressors with Neos converter

Fuse calculations for UL/cUL: the indicated fuse size is the maximum fuse size in order to protect the motor against short circuit.

Cable sizing according IEC

The tables below indicate the current carrying capacities of cables for 3 commonly used installation methods, calculated according to standard 60364-5-52 - electrical installations of buildings part 5 - selection and erection equipment and section 52 - current carrying capacities in wiring systems.

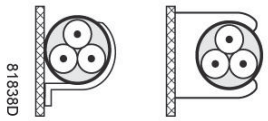
The allowed currents are valid for PVC insulated cables with three loaded copper conductors (maximum conductor temperature 70 °C).



Installation method B2 according table B.52.1.
Multi-core cable in conduit on a wooden wall

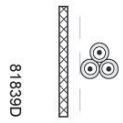
Maximum allowed current in function of the ambient temperature for installation method B2

	Ambient temperature				
Cable section	30 °C	40 °C	45 °C	50 °C	55 °C
4 mm²	< 27 A	< 23 A	< 21 A	< 19 A	< 16 A
6 mm²	< 34 A	< 30 A	< 27 A	< 24 A	< 21 A
10 mm²	< 46 A	< 40 A	< 36 A	< 33 A	< 28 A
16 mm²	< 62 A	< 54 A	< 49 A	< 44 A	< 38 A
25 mm²	< 80 A	< 70 A	< 63 A	< 57 A	< 49 A
35 mm²	< 99 A	< 86 A	< 78 A	< 70 A	< 60 A
50 mm²	< 118 A	< 103 A	< 93 A	< 84 A	< 72 A
70 mm²	< 149 A	< 130 A	< 118 A	< 106 A	< 91 A
95 mm²	< 179 A	< 156 A	< 141 A	< 127 A	< 109 A
120 mm²	< 206 A	< 179 A	< 163 A	< 146 A	< 126 A

	Installation method C according table B.52.1. Single-core or multi-core cable on a wooden wall

Maximum allowed current in function of the ambient temperature for installation method C

	Ambient temperature				
Cable section	**30 °C**	**40 °C**	**45 °C**	**50 °C**	**55 °C**
4 mm²	< 32 A	< 28 A	< 25 A	< 23 A	< 20 A
6 mm²	< 41 A	< 36 A	< 32 A	< 29 A	< 25 A
10 mm²	< 57 A	< 50 A	< 45 A	< 40 A	< 35 A
16 mm²	< 76 A	< 66 A	< 60 A	< 54 A	< 46 A
25 mm²	< 96 A	< 84 A	< 76 A	< 68 A	< 59 A
35 mm²	< 119 A	< 104 A	< 94 A	< 84 A	< 73 A
50 mm²	< 144 A	< 125 A	< 114 A	< 102 A	< 88 A
70 mm²	< 184 A	< 160 A	< 145 A	< 131 A	< 112 A
95 mm²	< 223 A	< 194 A	< 176 A	< 158 A	< 136 A
120 mm²	< 259 A	< 225 A	< 205 A	< 184 A	< 158 A
150 mm²	< 299 A	< 260 A	< 236 A	< 212 A	< 182 A
185 mm²	< 341 A	< 297 A	< 269 A	< 242 A	< 208 A
240 mm²	< 403 A	< 351 A	< 318 A	< 296 A	< 246 A
300 mm²	< 464 A	< 404 A	< 367 A	< 329 A	< 283 A

	Installation method F according table B.52.1. Single-core cables, touching in free air Clearance to wall not less than one cable diameter

Maximum allowed current in function of the ambient temperature for installation method F

	Ambient temperature				
Cable section	**30 °C**	**40 °C**	**45 °C**	**50 °C**	**55 °C**
25 mm²	< 110 A	< 96 A	< 87 A	< 78 A	< 67 A
35 mm²	< 137 A	< 119 A	< 108 A	< 97 A	< 84 A
50 mm²	< 167 A	< 145 A	< 132 A	< 119 A	< 102 A
70 mm²	< 216 A	< 188 A	< 171 A	< 153 A	< 132 A
95 mm²	< 264 A	< 230 A	< 209 A	< 187 A	< 161 A
120 mm²	< 308 A	< 268 A	< 243 A	< 219 A	< 188 A
150 mm²	< 356 A	< 310 A	< 281 A	< 253 A	< 217 A
185 mm²	< 409 A	< 356 A	< 323 A	< 290 A	< 249 A
240 mm²	< 485 A	< 422 A	< 383 A	< 344 A	< 296 A

Calculation method for IEC:

- Single supply cables (3 phases + PE - configuration (1)):
 - Add 10 % to the total compressor current (I_{tot}Pack or I_{tot}FF from the tables)
 - Install the prescribed fuse on each cable
- Parallel supply cable (2 x 3 phases + PE - configuration (2)):
 - Add 10 % to the total compressor current (I_{tot}Pack or I_{tot}FF from the tables) and divide by 2
 - Multiply the ampacity of the cables with 0.8 (see table A.52.17 (52-E1))
 - Install fuses of half the size of the recommended maximum fuse size on each cable.
- When using 2 x 3 phases + PE as in (3):
 - Add 10 % to the total compressor current (I_{tot}Pack or I_{tot}FF from the tables) and divide by √3
 - Multiply the ampacity of the cables with 0.8 (see table A.52.17 (52-E1))
 - Fuse size: the recommended maximum fuse size divided by √3 on each cable.
- Size of the PE cable:
 - For supply cables up to 35 mm²: same size as supply cables
 - For supply cables larger than 35 mm²: half the size of the supply wires

Always check the voltage drop over the cable (less than 5 % of the nominal voltage is recommended).

Example: I_{tot} = 89 A, maximum ambient temperature is 45 °C, recommended fuse = 100 A

- Single supply cables (3 phases + PE - configuration (1)):
 - I = 89 A + 10 % = 89 x 1.1 = 97.9 A
 - The table for B2 and ambient temperature = 45 ° C allows a maximum current of 93 A for a 50 mm² cable. For a cable of 70 mm², the maximum allowed current is 118 A, which is sufficient. Therefore, use a 3 x 70 mm² + 35 mm² cable.
 If method C is used, 50 mm² is suffficient. (35 mm² for method F) => cable 3 x 50 mm² + 25 mm².
- Parallel supply cable (2 x 3 phases + PE - configuration (2)):
 - I = (89 A + 10 %)/2 = (89 x 1.1)/2 = 49 A
 - For a cable of 25 mm², B2 at 45 °C, the maximum current is 63 A x 0.8 = 50.4 A. So 2 parallel cables of 3 x 25 mm² + 25 mm² are sufficient.
 - Install 50 A fuses on each cable instead of 100 A.

Cable sizing according UL/cUL

Calculation method according UL 508A, table 28.1 column 5: allowable current of insulated copper conductors (75 °C (167 °F)).

Maximum allowed current in function of the wire size

AWG or kcmil	Maximum current	AWG or kcmil	Maximum current
10	< 30 A	8	< 50 A
6	< 65 A	4	< 85 A
3	< 100 A	2	< 115 A
1	< 130 A	1/0	< 150 A
2/0	< 175 A	3/0	< 200 A
4/0	< 230 A	250	< 255 A
300	< 285 A	350	< 310 A
400	< 335 A	500	< 380 A

Calculation method for UL:

- Single supply cables (3 phases + 1 PE - configuration (1)):
 - Add 25 % to the total current from the tables (see UL 508A 28.3.2: "Ampacity shall have 125 % of the full load current")
 - Install the prescribed maximum fuse on each cable
- Parallel supply cable (2 x 3 phases + 2 PE - configuration (2)):
 - Add 25 % to the total current from the tables and divide by 2
 - Multiply the ampacity of the cables with 0.8 (see UL 508A table 28.1 continued)
 - Install fuses of half the size of the recommended maximum fuse size on each cable.
- When using 2 x 3 phase + 2 PE as in (3):
 - Add 25 % to the total current from the tables and divide by √3
 - Multiply the ampacity of the cables with 0.8 (see UL 508A table 28.1 continued)
 - Fuse size: the recommended maximum fuse size divided by √3 on each cable.
- Size PE cable:
 - For supply cables up to AWG8: same size as the supply cables
 - For supply cables larger than AWG8: use maximum allowed ampacity of the selected supply cables and compare with value in table below (see CEC Part 1 table 17)

< 100 A: use AWG8
< 200 A: use AWG6
< 300 A: use AWG4

Always check the voltage drop over the cable (less than 5 % of the nominal voltage is recommended).

Example of supply cable calculation: I_{tot} = 128 A, maximum ambient temperature is 45 °C, recommended fuse = 150 A

- Single supply cables (3 phases + 1 PE - configuration (1)):
 - I = 128 A + 25 % = 128 x 1.25 = 160 A
 - For AWG2/0, the maximum current is 175 A, which is sufficient => use AWG2/0
 - Install the prescribed maximum fuse (150 A) on each cable
- Parallel supply cable (2 x 3 phases + 2 PE - configuration (2)):
 - I = (128 A + 25%)/2 = (128 x 1.25)/2 = 80 A
 - For a AWG4, the maximum current is 85 A x 0.8 = 68 A, which is insufficient. For an AWG3, the maximum current is 100 x 0.8 = 80 A. So 2 parallel cables of 3 x AWG3 + 2 x AWG8 are sufficient.
 - Install 80 A fuses on each cable.

11.3 Protection settings

Settings for fan motor overload protection (Q15) (F15 for IT)

Frequency (Hz)	Voltage (V)	GA 37 VSD Q15 (A)	GA 45 VSD Q15 (A)
IEC			
50	200	5.9	
50	230	5.2	
50	400	3.0	3.6
50	500	3.0	3.0
60	200	6.1	
60	230	4.6	

Frequency (Hz)	Voltage (V)	GA 37 VSD Q15 (A)	GA 45 VSD Q15 (A)
60	380	2.6	3.9
60	460	2.6	3.5
UL/cUL			
60	200	6.1	
60	230	4.6	
60	460	2.6	3.5
60	575	2.6	3.5

11.4 Dryer switches

General

The regulating and safety devices are factory-adjusted to give optimum performance of the dryer.

Do not alter the setting of any of the devices.

11.5 Reference conditions and limitations

Reference conditions

Air inlet pressure (absolute)	bar	1
Air inlet pressure (absolute)	psi	14.5
Air inlet temperature	˚C	20
Air inlet temperature	˚F	68
Relative humidity	%	0
Working pressure		See section Compressor data.

On water-cooled units also:		
Cooling water inlet temperature	˚C	20
Cooling water inlet temperature	˚F	68

Limits

Maximum working pressure		See section Compressor data.
Minimum working pressure	bar(e)	4
Minimum working pressure	psig	58
Maximum air inlet temperature	˚C	46
Maximum air inlet temperature	˚F	115
Minimum ambient temperature	˚C	0
Minimum ambient temperature	˚F	32

Maximum altitude operation (1)	m	1000 m above sea level
Maximum altitude operation (1)	ft	3281 ft above sea level

(1): For operation at higher altitude: contact Atlas Copco

On water-cooled units also:		
Maximum cooling water outlet temperature	˚C	50
Maximum cooling water outlet temperature	˚F	122
Maximum cooling water inlet pressure	bar(e)	5
Maximum cooling water inlet pressure	psig	72.5

11.6 Compressor data

Reference conditions



All data specified below apply under reference conditions, see section Reference conditions and limitations.

GA 37 VSD

		13 bar 175 psi	**13 bar 175 psi**	**13 bar 175 psi**
Frequency	Hz	50 60	50 60	50 60
Number of compression stages		1	1	1
Normal effective working pressure	bar(e)	7	9.5	12.5
Normal effective working pressure	psig	102	138	181
Maximum effective working pressure, Workplace	bar(e)	7.5	10	13
Maximum effective working pressure, Workplace	psig	109	145	189
Maximum effective working pressure, Workplace Full-Feature	bar(e)	7.3	9.8	12.8
Maximum effective working pressure, Workplace Full-Feature	psig	106	142	186
Maximum motor shaft speed	rpm	3066	2683	2224
Minimum motor shaft speed	rpm	780	780	1172
Temperature of air leaving the outlet valve (approx.), Workplace	˚C	27	27	27
Temperature of air leaving the outlet valve (approx.), Workplace	˚F	81	81	81
Temperature of air leaving the outlet valve (approx.), Workplace Full-Feature	˚C	23	23	23
Temperature of air leaving the outlet valve (approx.), Workplace Full-Feature	˚F	73	73	73
Nominal motor power	kW	37	37	37

		13 bar 175 psi	**13 bar 175 psi**	**13 bar 175 psi**
Nominal motor power	hp	50	50	50
Dryer power at full load, Workplace Full-Feature units	kW 50 Hz 60 Hz	. 1.34 1.62	. 1.34 1.62	. 1.34 1.62
Dryer power at full load, Workplace Full-Feature units	hp 50 Hz 60 Hz	. 1.8 2.2	. 1.8 2.2	. 1.8 2.2
Refrigerant type, Workplace Full-Feature		R410A	R410A	R410A
Refrigerant quantity, Workplace Full-Feature	kg 50 Hz 60 Hz	. 0.97 1.01	. 0.97 1.01	. 0.97 1.01
Refrigerant quantity, Workplace Full-Feature	lb 50 Hz 60 Hz	. 2.14 2.23	. 2.14 2.23	. 2.14 2.23
Oil capacity, air-cooled	l	21	21	21
Oil capacity, air-cooled	US gal	5.55	5.55	5.55
Oil capacity, air-cooled	Imp gal	4.62	4.62	4.62
Oil capacity, water-cooled	l	17.9	17.9	17.9
Oil capacity, water-cooled	US gal	4.73	4.73	4.73
Oil capacity, water-cooled	Imp gal	3.94	3.94	3.94
Cooling water consumption (at water inlet temperature below 35 ˚C and temperature rise of 15 ˚C), water-cooled units	l/min	39	39	39
Cooling water consumption (at water inlet temperature below 95 ˚F and temperature rise of 27 ˚F), water-cooled units	cfm	1.38	1.38	1.38
Cooling water consumption (at water inlet temperature between 35 and 40 ˚C and temperature rise of 10 ˚C), water-cooled units	l/min	59	59	59
Cooling water consumption (at water inlet temperature between 95 and 104 ˚F and temperature rise of 18 ˚F), water-cooled units	cfm	2.08	2.08	2.08
Sound pressure level, 50 Hz (according to ISO 2151 (2004))	dB(A)	66	66	66
Sound pressure level, 60 Hz (according to ISO 2151 (2004))	dB(A)	67	67	67

GA 45 VSD

		13 bar 175 psi	**13 bar 175 psi**	**13 bar 175 psi**
Frequency	Hz	50 60	50 60	50 60
Number of compression stages		1	1	1
Normal effective working pressure	bar(e)	7	9.5	12.5
Normal effective working pressure	psig	102	138	181

		13 bar 175 psi	**13 bar 175 psi**	**13 bar 175 psi**
Maximum effective working pressure, Workplace	bar(e)	7.5	10	13
Maximum effective working pressure, Workplace	psig	109	145	189
Maximum effective working pressure, Workplace Full-Feature	bar(e)	7.3	9.8	12.8
Maximum effective working pressure, Workplace Full-Feature	psig	106	142	186
Maximum motor shaft speed	rpm	3627	3218	2727
Minimum motor shaft speed	rpm	780	780	1172
Temperature of air leaving the outlet valve (approx.), Workplace	˚C	27	27	27
Temperature of air leaving the outlet valve (approx.), Workplace	˚F	81	81	81
Temperature of air leaving the outlet valve (approx.), Workplace Full-Feature	˚C	23	23	23
Temperature of air leaving the outlet valve (approx.), Workplace Full-Feature	˚F	73	73	73
Nominal motor power	kW	45	45	45
Nominal motor power	hp	60	60	60
Dryer power at full load, Workplace Full-Feature units	kW 50 Hz 60 Hz	. 1.34 1.62	. 1.34 1.62	. 1.34 1.62
Dryer power at full load, Workplace Full-Feature units	hp 50 Hz 60 Hz	. 1.8 2.2	. 1.8 2.2	. 1.8 2.2
Refrigerant type, Workplace Full-Feature		R410A	R410A	R410A
Refrigerant quantity, Workplace Full-Feature	kg 50 Hz 60 Hz	. 0.97 1.01	. 0.97 1.01	. 0.97 1.01
Refrigerant quantity, Workplace Full-Feature	lb 50 Hz 60 Hz	. 2.14 2.23	. 2.14 2.23	. 2.14 2.23
Oil capacity, air-cooled	l	23	23	23
Oil capacity, air-cooled	US gal	6.08	6.08	6.08
Oil capacity, air-cooled	Imp gal	5.06	5.06	5.06
Oil capacity, water-cooled	l	17.9	17.9	17.9
Oil capacity, water-cooled	US gal	4.73	4.73	4.73
Oil capacity, water-cooled	Imp gal	3.94	3.94	3.94
Cooling water consumption (at water inlet temperature below 35 ˚C and temperature rise of 15 ˚C), water-cooled units	l/min	48	48	48
Cooling water consumption (at water inlet temperature below 95 ˚F and temperature rise of 27 ˚F), water-cooled units	cfm	1.7	1.7	1.7
Cooling water consumption (at water inlet temperature between 35 and 40 ˚C and temperature rise of 10 ˚C), water-cooled units	l/min	70	70	70

		13 bar 175 psi	13 bar 175 psi	13 bar 175 psi
Cooling water consumption (at water inlet temperature between 95 and 104 ˚F and temperature rise of 18 ˚F), water-cooled units	cfm	2.47	2.47	2.47
Sound pressure level, 50 Hz (according to ISO 2151 (2004))	dB(A)	69	69	69
Sound pressure level, 60 Hz (according to ISO 2151 (2004))	dB(A)	72	72	72

11.7 Technical data Elektronikon® controller

General

Supply voltage	24 V AC /16 VA 50/60Hz (+40%/-30%) 24 V DC/0.7 A
Type of protection	IP54 (front) IP21 (back)
Ambient and temperature conditions	IEC60068-2
• Operating temperature range • Storage temperature range	• -10°C…..+60°C (14 °F 140 °F) • -30°C…..+70°C (-22 °F 158 °F)
Permissible humidity	Relative humidity 90% No condensation
Noise emission	IEC61000-6-3
Noise immunity	IEC61000-6-2
Mounting	Cabinet door

Digital outputs

Number of outputs	9 (Elektronikon® Graphic controller - p.n. 1900 5200 10 …. 1900 5200 19)
Type	Relay (voltage free contacts)
Rated voltage AC	250 V AC / 10 A max.
Rated voltage DC	30 V DC / 10 A max.

Digital inputs

Number of inputs	10 (Elektronikon® Graphic controller - p.n. 1900 5200 10 …. 1900 5200 19)
Supply by controller	24 V DC
Supply protection	Short circuit protected to ground
Input protection	Not isolated

Analog inputs

Number of pressure inputs	2 (Elektronikon® Graphic controller - p.n. 1900 5200 10 …. 1900 5200 19)
Number of temperature inputs	5 (Elektronikon® Graphic controller - p.n. 1900 5200 10 …. 1900 5200 19)

12 Instructions for use

Oil separator vessel

This vessel can contain pressurised air. This can be potentially dangerous if the equipment is misused.
This vessel must only be used as a compressed air/oil separator tank and must be operated within the limits specified on the data plate.
No alterations must be made to this vessel by welding, drilling or other mechanical methods without the written permission of the manufacturer.
The pressure and temperature of this vessel must be clearly indicated.
The safety valve must correspond with pressure surges of 1.1 times the maximum allowable operating pressure. It should guarantee that the pressure will not permanently exceed the maximum allowable operating pressure of the vessel.
Use only oil as specified by the manufacturer.
Original bolts have to be used after opening for inspection. The maximum torque has to be taken into consideration: for M12 bolts 73 Nm (53.8 lbf.ft)), for M16 bolts 185 Nm (136.4 lbf.ft).

13 Guidelines for inspection

Guidelines

On the Declaration of Conformity / Declaration by the Manufacturer, the harmonised and/or other standards that have been used for the design are shown and/or referred to.

The Declaration of Conformity / Declaration by the Manufacturer is part of the documentation that is supplied with this compressor.

Local legal requirements and/or use outside the limits and/or conditions as specified by the manufacturer may require other inspection periods as mentioned below.

14 Pressure equipment directives

Components subject to 97/23/EC Pressure Equipment Directive

The following table contains the necessary information for the inspection of all pressure equipment of category II and higher according to the Pressure Equipment Directive 97/23/EC and all pressure equipment according to the Simple Pressure Vessel Directive 2009/105/EC.

Compressor type	Component	Description	Volume	Design pressure	Minimum and maximum design temperature	PED Class
GA 37 VSD and GA 45 VSD	1625 5641 99	Vessel	43.1 l	15 bar(e)	-10 ˚C/ 120 ˚C	II
	0830 1008 39	Safety valve	-	-	-	IV
	0830 1008 40	Safety valve	-	-	-	IV
	0832 1000 78	Safety valve	-	-	-	IV
	0832 1000 79	Safety valve	-	-	-	IV

Compressor type	Component	Description	Number of cycles (1)	Minimum wall thickness	Inspection frequency (2)
GA 37 VSD and GA 45 VSD	1625 5641 99	Vessel	2×10^6	8 mm	10 years
	0830 1000 38	Safety valve	-	-	-
	0830 1000 40	Safety valve	-	-	-
	0832 1000 78	Safety valve	-	-	-
	0832 1000 79	Safety valve	-	-	-

The compressors conform to PED smaller than category II.

(1) The number of cycles refers to the number of cycles from 0 bar(e) to maximum pressure.

(2) The minimum wall thickness must be respected at all times. Inspection techniques such as ultrasonic or X-ray are equivalent to hydrostatic testing for this equipment.

15 Declaration of conformity

1

EC DECLARATION OF CONFORMITY

2 We, (1) ….., declare under our sole responsibility, that the product
3 Machine name
4 Machine type
5 Serial number

6 Which falls under the provisions of article 12.2 of the EC Directive 2006/42/EC on the approximation of the laws of the Member States relating to machinery, is in conformity with the relevant Essential Health and Safety Requirements of this directive.

The machinery complies also with the requirements of the following directives and their amendments as indicated.

7

	Directive on the approximation of laws of the Member States relating to		Harmonized and/or Technical Standards used	Att' mnt
a.	Pressure equipment	97/23/EC		
b.	Machinery safety	2006/42/EC	EN ISO 12100 – 1 EN ISO 12100 – 2 EN 1012 – 1	
c.	Simple pressure vessel	2009/105/EC		
d.	Electromagnetic compatibility	2004/108/EC	EN 61000-6-2 EN 61000-6-4	
e.	Low voltage equipment	2006/95/EC	EN 60034 EN 60204-1 EN 60439	
f.	Outdoor noise emission	2000/14/EC		
g.	Equipment and protective systems in potentially explosive atmospheres	94/9/EC		
h.	Medical devices General	93/42/EEC	EN ISO 13845 EN ISO 14971 EN 737-3	
i.				

8.a The harmonized and the technical standards used are identified in the attachments hereafter

8.b *(Product company)* is authorized to compile the technical file.

9
10

	Conformity of the specification to the directives	Conformity of the product to the specification and by implication to the directives
11 12 Issued by	Product engineering	Manufacturing
13 14 Name		
15 Signature		
16 Date		

81679D

Typical example of a Declaration of Conformity document

(1): Contact address:

Atlas Copco Airpower n.v.

P.O. Box 100

B-2610 Wilrijk (Antwerp)

Belgium

On the Declaration of Conformity / Declaration by the Manufacturer, the harmonised and/or other standards that have been used for the design are shown and/or referred to.

The Declaration of Conformity / Declaration by the Manufacturer is part of the documentation that is supplied with this device.

In order to be First in Mind—First in Choice® for all your quality compressed air needs, Atlas Copco delivers the products and services that help to increase your business' efficiency and profitability.

Atlas Copco's pursuit of innovation never ceases, driven by our need for reliability and efficiency. Always working with you, we are committed to providing you the customized quality air solution that is the driving force behind your business.

No. 2920 7105 03 / 2014 - 02 - Printed in Belgium

Atlas Copco

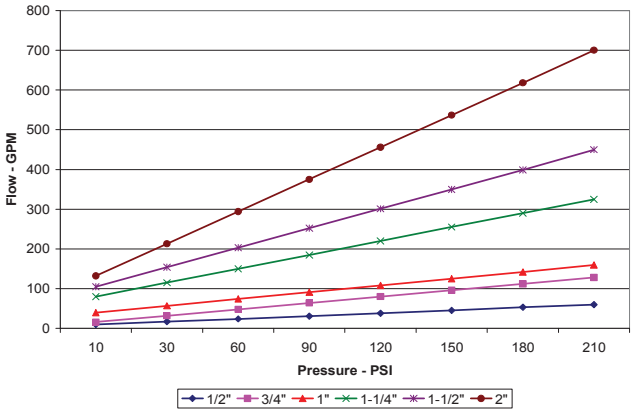
www.atlascopco.com

SOLENOID VALVES

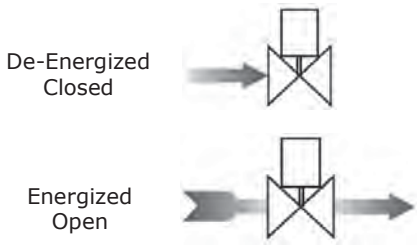


Technical Specifications	
Body Material	Brass or 316 Stainless Steel
Seal/Diaphragm	EPDM (standard), Viton (optional)
Voltages	AC120V, AC220V, AC24V
Sizes	1/4”, 3/8”, 1/2”, 3/4”, 1”, 1-1/4”, 1-1/2”, 2”
Temperature Range	6° F to 250° F
Pressure Range	0.5 psi to 232 psi

Flow Chart

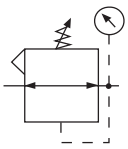


Normally Closed



Size	Orifice (mm)	Cv (min)	Operating pressure (psi) (min)	(max)	Temp (max)	Coil Class	Dimensions (inches)	Weight (pounds)
1/4"	10	1.5	0	225	250° F	F	2.1×1.3×3.7	1.0
3/8”	13	4.5	7	225	250° F	F	2.6×1.9×4.4	1.8
1/2”	13	4.5	7	225	250° F	F	2.6×1.9×4.4	1.8
3/4”	20	7.6	7	225	250° F	F	3.0×2.3×4.6	2.0
1”	25	12	7	225	250° F	F	3.8×2.8×5.2	3.1
1-1/4”	35	22	7	225	250° F	F	5.2×3.8×5.8	6.0
1-1/2”	40	30	7	225	250° F	F	5.2×3.8×5.8	6.0
2”	50	48	7	225	250° F	F	6.5×4.7×6.6	10.5

Dial-Air™ Regulator R41





R41-0B-000

= **"Most Popular"**

Specifications

Flow Capacity*	1-1/2, 2	1600 SCFM (755 dm^3/s)
Adjusting Range Pressure		0 to 160 PSIG (0 to 11 bar)
Bleed Rate		0.05 SCFM (0,024 dm^3/s)
Maximum Supply Pressure		300 PSIG (20.7 bar)
Operating Temperature		32° to 150°F (0° to 65.5°C)
Port Size	NPT / BSPP-G	1-1/2, 2
Gauge Port (2 ea.)	NPT / BSPT-Rc	1/4
Weight	lb. (kg)	9 (4.1)

* Inlet pressure 100 PSIG (6.9 bar). Secondary pressure 80 PSIG (5.5 bar).

Materials of Construction

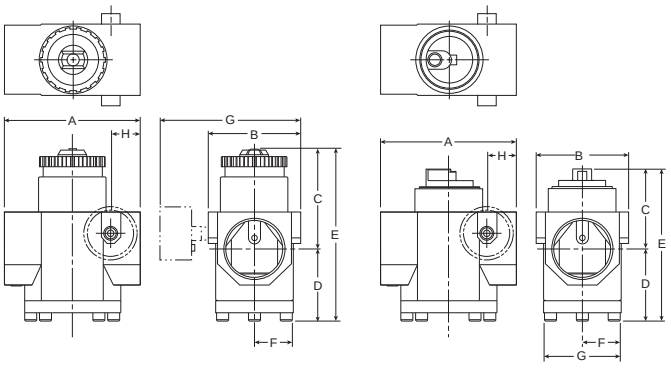
Body	Zinc
Bonnet	Zinc / Brass
Piston	Zinc
Seals	Nitrile
Springs	Steel
Valve Assembly	Brass / Nitrile / Acetal

Features

- Balanced Valve Design
- Non-Rising Pressure Adjusting Dial
- High-Relief Flow (3/16" Relief Orifice)
- Two 1/4" NPT / BSPT-Rc Gauge Ports, Usually Used for Additional Outlets
- Piston Operated

⚠ WARNING

Product rupture can cause serious injury.
Do not connect regulator to bottled gas.
Do not exceed maximum primary pressure rating.



Remote Operated

CAUTION:

REGULATOR PRESSURE ADJUSTMENT – The working range of knob adjustment is designed to permit outlet pressures within their full range. Pressure adjustment beyond this range is also possible because the knob is not a limiting device. This is a common characteristic of most industrial regulators, and limiting devices may be obtained only by special design.

For best performance, regulated pressure should always be set by increasing the pressure up to the desired setting.

Dimensions

Models (Inches (mm))	A	B	C	D	E	F	G	H
Standard Unit R41-XX-000	5.31 (135)	3.58 (91)	4.02 (102)	2.79 (71)	6.81 (173)	1.79 (45.7)	— —	1.15 (29.2)
With Gauge (order separately) R41-XX-XXX	5.31 (135)	3.58 (91)	4.02 (102)	2.79 (71)	6.81 (173)	1.79 (45.7)	5.29 (134.6)	1.15 (29.2)
Remote Operated R41-XX-R00	5.31 (135)	3.58 (91)	3.11 (78.9)	2.79 (71)	5.90 (149.8)	1.50 (38)	3.00 (76)	1.15 (29.2)

= "Most Popular"

Replacement Kits

Adjustment Dial Knob RRP-16-024-000

Conversion Kit (Series A to Series B) RRP-95-766

O-ring, Repair Kit GRP-95-262

Piston, Bottom and O-ring Seal.....RRP-95-192

Spring, Regulating, Belleville Washer –
2 to 40 PSIG (0.1 to 3 bar) RRP-95-906
5 to 160 PSIG (0.4 to 11 bar) RRP-95-905

Spring, Valve RRP-95-024

Valve –
Main with O-ring Seal.....RRP-95-153
Main (Remote) with O-ring Seal RRP-96-951
Pilot with O-ring and Valve Spring RRP-96-935

Accessories

Gauge, Pressure –
0 to 60 PSIG (0 to 4 bar), 2" Dial Face,
1/4" NPT, CBM K4520N14060

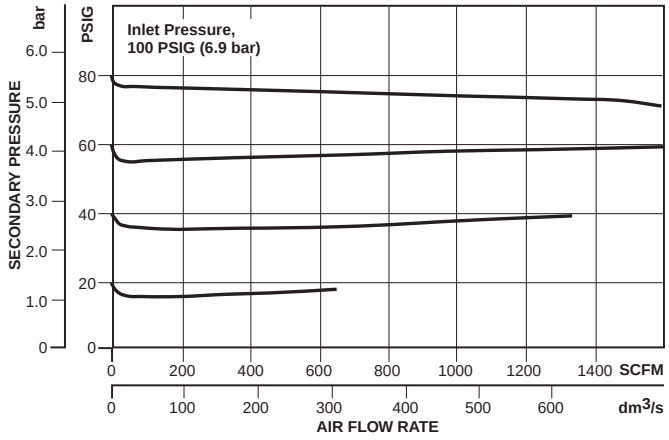
0 to 160 PSIG (0 to 11 bar), 2" Dial Face,
1/4" NPT, CBM K4520N14160

0 to 160 PSIG, 1-3/4" Digital Round,
1/4" NPT K4517N14160D

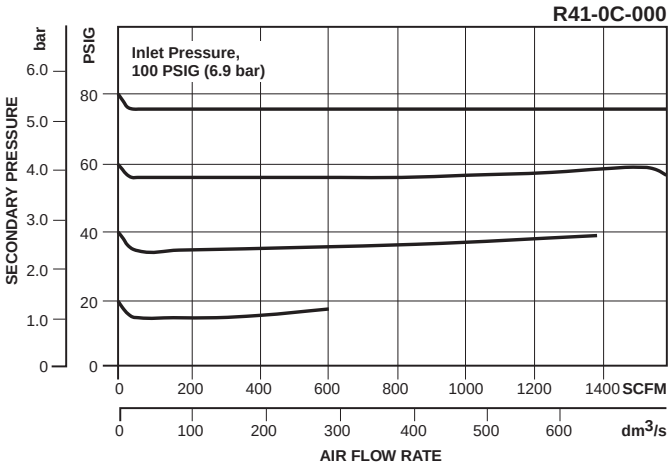
Tamper Resistant Kit..... RRP-95-585

Wall Mounting Bracket, Gauge Port Adapter,
1/4" NPT RRP-95-590

R41-0B-000



R41-0C-000



Ordering Information

Model Type	Port Size	High Flow 5 to 160 PSIG (0.4 to 11 bar)	Low Pressure 2 to 40 PSIG (0.1 to 3 bar)	Remote 5 to 160 PSIG (0.4 to 11 bar)
Relieving	1-1/2	R41-0B-000	R41-0B-L00	R41-0B-R00
	2	R41-0C-000	R41-0C-L00	R41-0C-R00

Options - To order an option supplied with the unit model, add the appropriate coded suffix letter in the designated position of the model number.

Atlas Copco

Compressed Air Filters





Sustainable Productivity

Atlas Copco

How clean is your air?

Your production processes and end products depend on the best quality compressed air. Untreated compressed air may cause extensive damage and lead to serious performance degradation. To protect your investment, equipment and processes, Atlas Copco offers a comprehensive line-up of innovative filtration solutions based on enhanced glass fiber media to meet your specific needs.

POTENTIAL CONTAMINANTS



Compressed air can be contaminated by dirt, water and oil, which can be further divided as follows:

- Dirt: micro-organisms, dust, solid particles, rust particles.
- Water: water vapor, condensed liquid water, water aerosols, acidic condensates.
- Oil: liquid oil, oil aerosol, hydrocarbon vapor.



THE NEED FOR PURITY

If these contaminants are not removed from a compressed air system, they can lead to numerous problems such as:

- Microbiological contamination.
- Corrosion within storage vessels and the distribution system.
- Damaged production equipment.
- Blocked or frozen valves, cylinders, air motors and tools.
- Premature unplanned desiccant changes for adsorption dryers.

Such problems will ultimately lead to inefficient production processes, and spoiled, damaged or to be reworked products. Contamination of compressed air can reduce production efficiency and increase manufacturing costs.



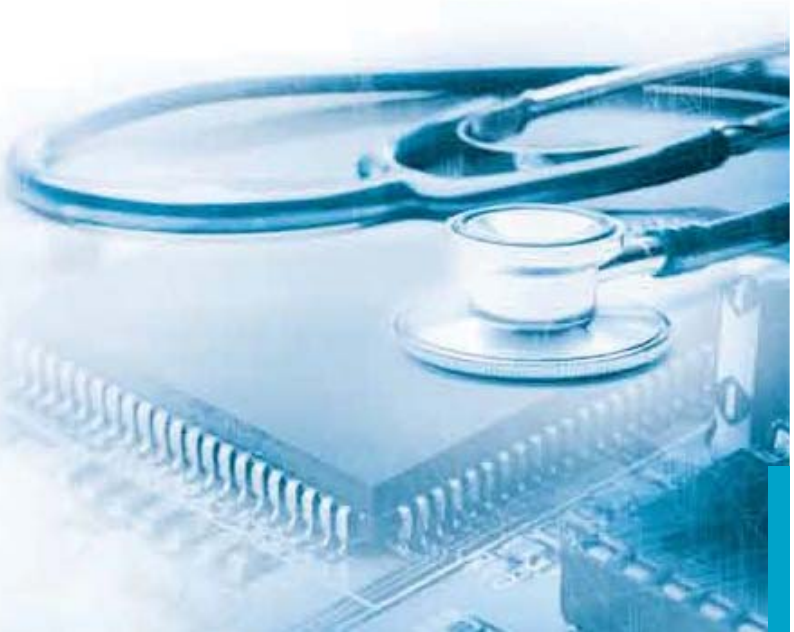


THE ATLAS COPCO SOLUTION

Building on many years of experience in compressed air solutions and continuous in-depth research and development, Atlas Copco offers the widest selection of filtration solutions and application knowledge. Our top-of-the-line DD+, DDp+, PD+, PDp+ and QD+ filters efficiently reduce all types of contamination with minimal pressure drop. These innovative filtration solutions with optimized glass fiber media suit the high-quality requirements of your specific application.

IMMENSE ENERGY SAVINGS

Furthermore, Atlas Copco's filters offer significant energy savings thanks to their optimized air flows and air flow path with low resistance, and housings and cartridges that are engineered for minimal pressure drop.



How clean is our compressed air?

As compressed air is a critical utility found in most manufacturing facilities which comes into direct or indirect contact with your final products or processes, it is vital to establish a minimum acceptable air purity level. The International Organization for Standardization (ISO) is the world's largest developer and publisher of international standards, and ISO 8573 relates to compressed air. Atlas Copco designs filtration solutions to provide compressed air purity that meets the levels specified in this standard.

COMPRESSED AIR ACCORDING TO ISO 8573-1:2010

ISO 8573-1:2010 specifies purity classes of compressed air with respect to particles, water and oil, independent of the location in the compressed air system at which the air is specified or measured.

PURITY CLASS	Solid particles			Water		Total oil*
	Number of particles per m³			Pressure dewpoint		Concentration
	0.1-0.5 µm	0.5-1.0 µm	1.0-5.0 µm	°C	°F	mg/m³
0	As specified by the equipment user or supplier and more stringent than Class 1.					
1	≤ 20,000	≤ 400	≤ 10	≤ -70	≤ -94	≤ 0.01
2	≤ 400,000	≤ 6,000	≤ 100	≤ -40	≤ -40	≤ 0.1
3	-	≤ 90,000	≤ 1,000	≤ -20	≤ -4	≤ 1
4	-	-	≤ 10,000	≤ 3	≤ 37.4	≤ 5
5	-	-	≤ 100,000	≤ 7	≤ 44.6	-
6	≤ 5 mg/m³			≤ 10	≤ 50.0	-

** Liquid, aerosol and vapor.*

ISO 8573-1 CLASS 0 CERTIFICATION

As leader in the field of oil-free air compression technology, Atlas Copco was the first manufacturer to be awarded ISO 8573-1 Class 0 certification for its Z and AQ series of oil-free compressors.
Only oil-free compressors deliver oil-free air.



IMPORTANT GUIDELINES

When selecting purification equipment for your compressed air system, these are some useful guidelines to consider:

1. Each point of use in the system may require a different quality of compressed air, dependent on the application.
2. Ensure that the purification equipment being considered will actually provide delivered air purity in accordance with classifications selected from the table above.
3. When comparing filters, ensure that they have been tested in accordance with the ISO 8573 and ISO 12500 series of standards.
4. The filter performance is highly dependent on the inlet conditions. Keep this in mind when comparing filtration solutions.
5. When considering the operational costs of oil coalescence filters, only compare the initial saturated pressure loss, as dry pressure loss is not representative for performance in a normally wet compressed air system.
6. For dust filters, mind that the pressure drop rises over time. A low starting pressure drop does not mean it will remain low throughout the filter element's lifetime.
7. Consider the total cost of ownership for purification equipment (purchase, operational and maintenance costs).

Your Atlas Copco representative can help you select the most optimal purification equipment for your compressed air system.



High performance filtration

In almost all applications, contamination of the air supply can cause serious performance decline and increase maintenance costs in terms of actual repairs and lost productivity. Atlas Copco's innovative filtration solutions are engineered to cost-effectively provide the best quality air and meet today's increasing quality demands. They are fully certified according to ISO standards by independent laboratories.



1 **Enhanced high-performance stainless steel filter cores** ensure ultimate strength and low risk of implosion.

2 **Protection paper** avoids direct contact between filter media and stainless steel filter core.

3 **Epoxy sealed caps** for reliable filtration.

4 **New, enhanced glass fiber media** ensure high filter efficiency, low pressure drop, and guaranteed lifetime performance. For oil coalescence filters, multiple layers are wrapped around each other to avoid the risk of early oil breakthrough.

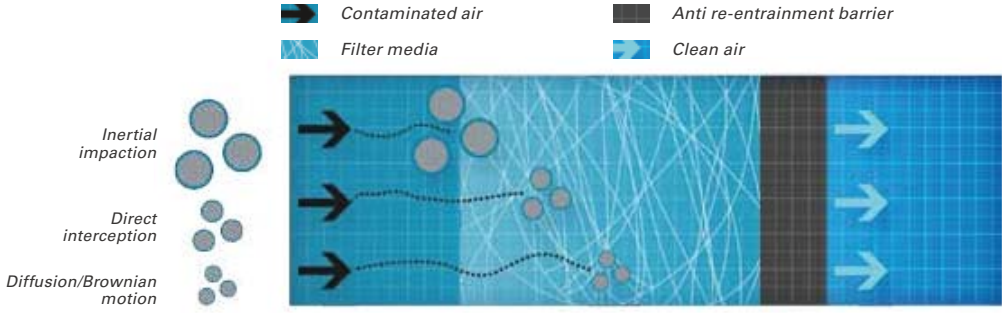
6 **Double O-rings** guarantee proper sealing to reduce leakage risks and increase energy savings.

7 Increased **user friendliness** and reliability via push-on element.

8 **Internal ribs** support the element and facilitate the route of oil droplets.

Oil coalescence filters the double drainage layer (outer protection paper and foam) has a large drainage capacity which is ideal for variable speed compressors. Moreover, the poly-urethane foam avoids oil re-entrainment.

5 **Dust filters** the open foam acts as a pre-filter for the largest dust particles, which prolongs the filter lifetime.



For optimal filtration, Atlas Copco filters apply a triple filtration function: inertial impaction, direct interception, and diffusion.



DD+ FILTER RANGE

Coalescing filters for general purpose protection, removing solid particles, liquid water and oil aerosol.
Total Mass Efficiency: 99.3%.

For optimum filtration, a DD+ filter should be preceded by a water separator.



DDp+ FILTER RANGE

Particulate filters for dust protection.
Count Efficiency: 99.92% at most penetrating particle size.

A DDp+ filter should be preceded by a dryer at all times.



PD+ FILTER RANGE

High-efficiency coalescing filters, removing solid particles, liquid water and oil aerosol.
Total Mass Efficiency: 99.92%.

For optimum filtration, a PD+ filter should be preceded by a DD+ filter at all times.



PDp+ FILTER RANGE

High-efficiency particulate filters for dust protection. Count Efficiency: 99.98% at most penetrating particle size.

A PDp+ filter should be preceded by a dryer at all times.



QD+ FILTER RANGE

Activated carbon filter for removal of oil vapor and hydrocarbon odors with a maximum remaining oil content of 0.003 mg/m³ (0.003 ppm).
1,000 hour lifetime.



QDT FILTER RANGE

Activated carbon filter with long lifetime for removal of oil vapor and hydrocarbon odors with a maximum remaining oil content of 0.003 mg/m³ (0.003 ppm).
4,000 hour lifetime.

For optimum filtration, a QD+/QDT filter should be protected by the right pre-filtration including a DD+ and PD+ filter at all times.



Meeting your every demand

The quality of air required throughout a typical compressed air system varies. With its extensive filter range, Atlas Copco can perfectly match your precise requirements, ensuring that all types of contamination are avoided and costs are reduced to an absolute minimum.

	DDp+	PDp+	DD+	PD+
Filter type	Solid particles	Solid particles	Oil aerosol & solid particles	Oil aerosol & solid particles
Test method	ISO 12500-3	ISO 12500-3	ISO 8573-2, ISO 12500-1	ISO 8573-2, ISO 12500-1
Count efficiency (% at MPPS)	(MPPS=0.1 µm) 99.92	(MPPS=0.06 µm) 99.98	NA	NA
Count efficiency (% at 1 µm)	99.998	> 99.999	NA	NA
Count efficiency (% at 0.01 µm)	99.93	99.995	NA	NA
Max oil carry-over (mg/m³)	NA	NA	0.07*	0.008*
Dry pressure drop (mbar)	85	100	NA	NA
Wet pressure drop (mbar)*	NA	NA	180	215
Wet pressure drop (mbar), in typical compressor installation	NA	NA	160	175 ***
Element service	After 4,000 operating hours or 1 year or pressure drop > 350 mbar	After 4,000 operating hours or 1 year or pressure drop > 350 mbar	After 4,000 operating hours or 1 year	After 4,000 operating hours or 1 year
Precede with	-	DDp+	WSD	WSD & DD+

	QD+	QDT
Filter type	Oil vapor	Oil vapor
Test method	ISO 8573-5	ISO 8573-5
Count efficiency (% at MPPS)	NA	NA
Count efficiency (% at 1 µm)	NA	NA
Count efficiency (% at 0.01 µm)	NA	NA
Max oil carry-over (mg/m³)	0.003**	0.003**
Dry pressure drop (mbar)	140	350
Wet pressure drop (mbar)*	NA	NA
Wet pressure drop (mbar), in typical compressor installation	NA	NA
Element service	After 1,000 operating hours (at 20°C) or 1 year	After 4,000 operating hours (at 35°C) or 1 year
Precede with	WSD & DD+ & PD+	WSD & DD+ & PD+

** Inlet oil concentration = 10 mg/m³, particle size distribution with mean size as close to MPPS as allowed by ISO, to represent a real compressor's outlet.*
*** Inlet oil concentration = 0.01 mg/m³.*
**** PD+ after DD+.*



EXTREMELY RELIABLE HOUSINGS

Atlas Copco filter elements are incorporated into solid, durable housings. These housings are designed with a keen eye for serviceability, which makes replacing the filter elements easy.

The threaded range covers from 10 l/s to 550 l/s. A high-pressure range from 15 l/s to 490 l/s is also available.



1. Audible alarm for assured peace of mind.
2. External ribs enable a firm grip to allow for easy removal of the bowl.
3. Die cast aluminum housing with special anodized treatment outside and inside to protect against corrosion.
4. High performance automatic drain for increased reliability.
5. Easy monitoring via sight glass.
6. Unique head design (inlet guide) for reduced pressure drop and increased savings.

The differential pressure indicator is standard on sizes 10-35. The differential pressure gauge is standard on sizes 55 and bigger.

The flanged range covers from 550 l/s to 8000 l/s.



1. Optimal internal design ensures high performance while keeping the pressure drop of the filter low.
2. KTL coating ensures a lifetime of at least 20 years of filter housing.
3. High performance electronic water drain (EWD) for increased reliability.
4. Special rotating system for the bottom cover facilitates replacement of filter cartridges.

Fully tested to all relevant ISO standards

Atlas Copco filters are qualified according to the ISO 8573-1:2010 standards. This is the latest edition of the standard. Beware of filters that comply with earlier editions of the standard, such as ISO 8573-1:1991 or ISO 8573-1:2001. These may result in a different, inferior quality of delivered compressed air.

Furthermore, our filters comply with ISO 12500-1:2007 and ISO 12500-3:2009, which specifies the test layout and test procedures required for testing coalescing filters and solid particle filters used in compressed air systems to determine their effectiveness in removing oil aerosols and solid particles.



ISO CERTIFICATION

Atlas Copco's filters have been fully tested and qualified according to the following ISO standards:

- ISO 8573: Compressed air
- ISO 8573-1: Compressed air - Contaminants and purity classes
- ISO 8573-2: Compressed air - Test method for oil aerosol content
- ISO 8573-4: Compressed air - Test method for dust
- ISO 12500: Filters for compressed air - test methods
- ISO 12500-1: Filters for compressed air – test methods – oil aerosols
- ISO 12500-3: Filters for compressed air – test methods – particulates

Tests have been conducted in-house and in external labs, and independently validated by TÜV.

SUITABLE FOR FOOD APPLICATIONS

Compressed air may come into direct or indirect contact with food. When this happens, for example during production or processing, this requires a much higher level of contaminant control. Particular attention needs to be given to contaminants added during the compression and the distribution process, such as bread packaging, fluidized bed in the transfer of flour from a tanker etc. Atlas Copco's filters comply with the bacteriological filtration grade and the British Compressed Air Society (BCAS) Food Grade Compressed Air Code of Practice. Non-contact recommendation is purity class 1:4:1 according to ISO 8573-1:2010.


Certificate of Filtration Efficiencies

Evaluation of Filtration Efficiencies Against Bacterial and Viral Aerosol Challenges



Ideal for all points of use

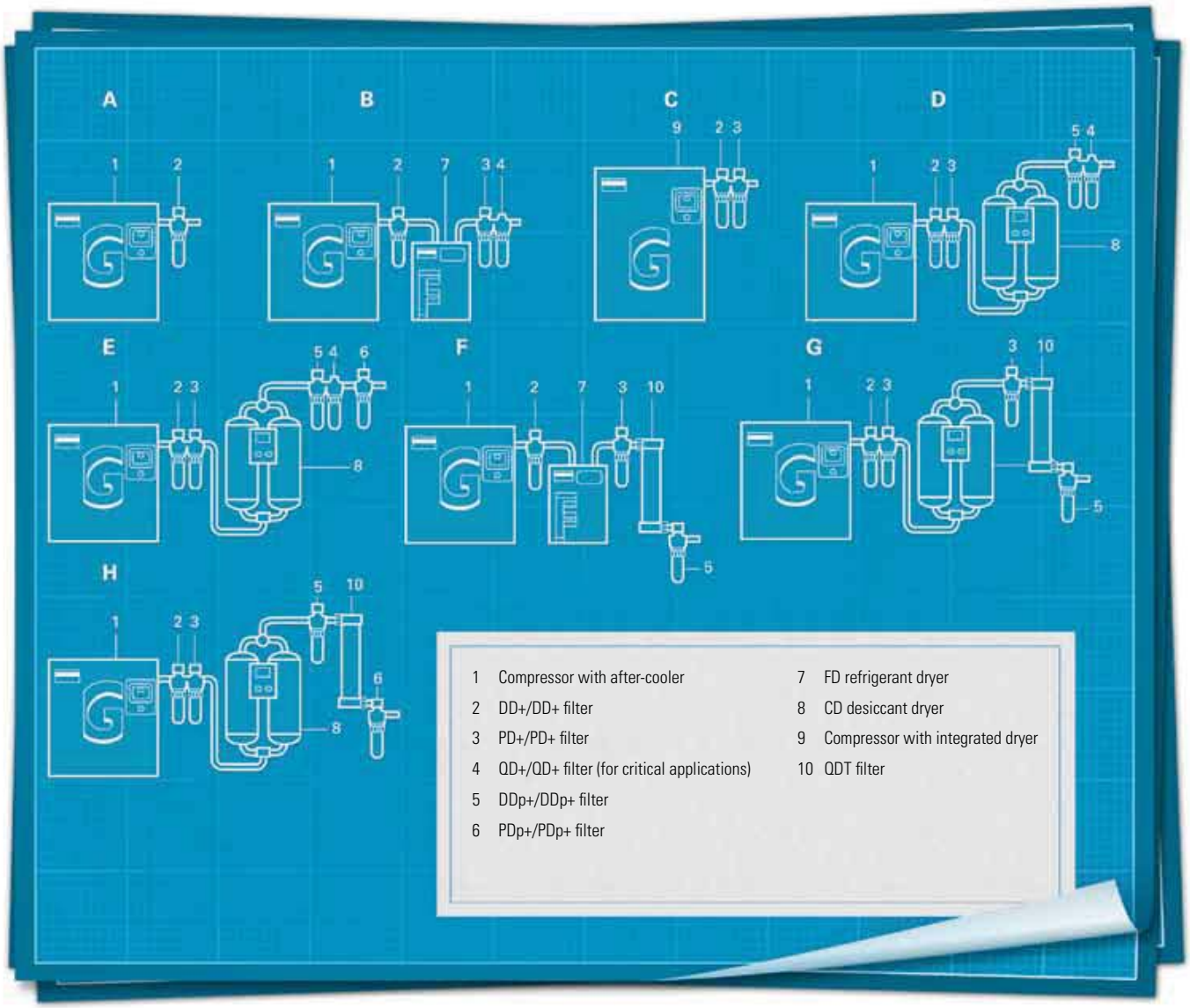
As mentioned earlier, at different points of use, different air qualities might be needed, depending on the application. The various air purity classes are expressed in the table below, which clearly shows the various Atlas Copco filters and dryers that meet all the different classes.

ISO 8573-1:2010 CLASS	Solid particles		Water	Oil
	Wet conditions	Dry conditions		(liquid, aerosol, vapor)
0				Oil-free compressor
1	DD+ & PD+	DDp+ & PDp+	CD/BD/AD/XD desiccant dryer	DD+ & PD+ & QD+/QDT
2	DD+	DDp+	CD/BD/AD/XD/MD/ND desiccant dryer	DD+ & PD+
3	DD+	DDp+	CD/BD/AD/XD/MD/ND desiccant dryer, SD membrane dryer	DD+
4	DD+	DDp+	FD/ID/FX refrigerant dryer, SD membrane dryer	DD+
5	DD+	DDp+	FD/ID/FX refrigerant dryer, SD membrane dryer	-
6	-	-	FD/ID/FX refrigerant dryer, SD membrane dryer	-



Unequalled filter performance

For every required air purity, Atlas Copco delivers a dedicated filtration and dryer solution. Some examples of typical installations are given below. Your service engineer will assist to provide you with a customized solution for each requirement.



A	General purpose protection (air purity to ISO 8573-1: class 2.-.3)
B	High quality air with reduced dew point (air purity to ISO 8573-1: class 1:4:1)
C	General purpose protection and reduced oil concentration (air purity to ISO 8573-1: class 1.-.2)
D	High quality air with extremely low dew point (air purity to ISO 8573-1: class 2:2:1)
E	High quality air with extremely low dew point (air purity to ISO 8573-1: class 1:2:1)
F	Upper class quality air with reduced dew point (air purity to ISO 8573-1: class 2:4:1)
G	Upper class quality air with extremely low dew point (air purity to ISO 8573-1: class 2:2:1)
H	Upper class quality air with extremely low dew point (air purity to ISO 8573-1: 1:2:1)

Maximize efficiency, improve reliability, save costs

As the cost of compressed air can represent over 40% of your total energy expenses, conducting an energy efficient strategy is one of your top priorities. Incorporating innovative filter design as well as beneficial cartridge changes, Atlas Copco's filter range offers you real energy savings without compromise in production reliability and efficiency.



Recommended filter cartridge change:

- DD+, PD+, QDT: at least once a year or every 4,000 hours.
- DDp+, PDp+: at least once a year or every 4,000 hours or when the pressure drop reaches 350 mbar.
- QD+: at least once a year or every 1,000 hours.

OPTIMIZING FILTER PERFORMANCE

To obtain supreme air purity, optimal filter performance is the key. As one of the main filter components protecting your compressed air system, the cartridge continuously comes into contact with oily, acidic condensate and dirt particles. To guarantee high filtration capabilities at the same low energy costs, an annual cartridge change is essential. This not only assures high filter performance with low pressure drop but also safeguards your valuable equipment, production process and, most importantly, your end product.

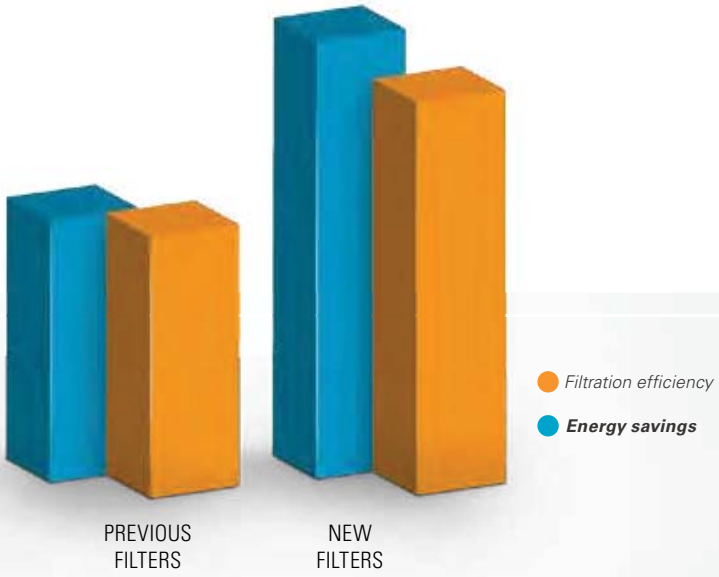
SUPREME FILTRATION

Designed to meet current and future demands, Atlas Copco's DD+ and PD+ filter ranges feature an exceptional flow path through the housing and cartridge which reduces air turbulence and pressure drops. In addition, it also limits operating pressure and offers you real energy savings without compromise in production reliability and efficiency.



Significant cost savings

Designed to combine maximum contaminant removal efficiency with minimum pressure drop, Atlas Copco's state-of-the-art filters contribute to low energy consumption of your compressed air system. This is possible through their enhanced glass fiber filter media in a deep-wrapped structure, low resistance to the air flow, and the housing and cartridge that are engineered for minimal pressure drop.



CREATE AN ENERGY REDUCTION STRATEGY

Taking technology to a whole new level, Atlas Copco's filter range achieves maximum cost savings, allowing you to conduct a truly efficient energy reduction strategy while maintaining a superb filtration performance.

ENERGY COSTS OF HIGH PRESSURE DROP

A pirate part might be cheaper in actual purchase cost. However, initial purchase cost is not the only cost to consider. Saving energy costs might be less tangible but every mbar pressure drop negatively affects power consumption and operating cost. For a unit running at 120 l/s at 7 bar and 4,000 hours/year, an additional pressure drop of 200 mbar costs an extra 200 euro per year.

Proven peace of mind

Building on Atlas Copco's know-how and years of experience with compressed air solutions, the entire filter range is produced in-house, on the most advanced production lines, and tested using the most stringent methods in the industry. You can rest assured at all times: severe certification and testing procedures are conducted to ensure air is supplied to the highest standards of quality control.

YOUR PARTNER FOR A TOTAL QUALITY AIR SOLUTION

To further reduce any type of contamination within your process and protect your equipment, Atlas Copco presents a complete range of quality air solutions to meet your every need. This way, only Atlas Copco can ensure 100% quality... not only at the time of delivery, but for many, many years to come. A total quality air solution for any application.



ALL THE ACCESSORIES AND OPTIONS YOU NEED

- Filter connection kit allows easy mounting of filters in series (sizes 10-550 l/s).
- Wall mounting kit simplifies installation (sizes 10-550 l/s).
- Quick coupling for easy connection to drain collector or oil/ water separator (sizes 10-550 l/s).
- Voltage-free contact mounted in the differential pressure gauge, to give remote indication of cartridge replacement.
- EWD electronic drain with no loss of compressed air and an alarm function (EWD is optional on sizes 10-550 l/s; standard on sizes ≥550F).





Driven by innovation

With more than 135 years of innovation and experience, Atlas Copco will deliver the products and services to help maximize your company's efficiency and productivity. As an industry leader, we are dedicated to offering high air quality at the lowest possible cost of ownership. Through continuous innovation, we strive to safeguard your bottom line and bring you peace of mind.



Building on interaction

As part of our long-term relationship with our customers, we have accumulated extensive knowledge of a wide diversity of processes, needs and objectives. This gives us the flexibility to adapt and efficiently produce customized compressed air solutions that meet and exceed your expectations.



A committed business partner

With a presence in over 170 countries, we will deliver high-quality customer service anywhere, anytime. Our highly skilled technicians are available 24/7 and are supported by an efficient logistics organization, ensuring fast delivery of genuine spare parts when you need them. We are committed to providing the best possible know-how and technology to help your company produce, grow, and succeed. With Atlas Copco you can rest assured that your superior productivity is our first concern!

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Quality Air Solutions

Compressed Air Filters



Your production processes and end products depend on the best quality compressed air. Untreated compressed air may cause extensive damage and lead to serious performance degradation. To protect your investment, equipment and processes, Atlas Copco offers a comprehensive line-up of innovative filtration solutions based on enhanced glass fiber media to efficiently reduce all types of contamination.



YOUR BENEFITS:

- Maximum contaminant removal
- Significant energy savings
- Limited system operating costs
- Increased reliability
- Easy maintenance

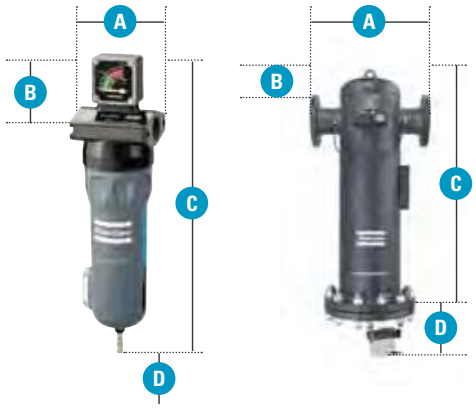
Sustainable Productivity

Atlas Copco

TECHNICAL SPECIFICATIONS

DD+, DDp+, PD+, PDp+, QD+

FILTER SIZE	Nominal capacity		Reference pressure		Maximum pressure		Connections	Dimensions						Free space for cartridge replacement		Weight	
								A		B		C		D			
	l/s	cfm	bar(e)	psig	bar(e)	psig		mm	in	mm	in	mm	in	mm	in	kg	lbs
10+	10	21	7	102	20	290	3/8	90	3.5	61	2.4	268	10.6	75	2.9	1.0	2.2
20+	20	42	7	102	20	290	1/2	90	3.5	61	2.4	268	10.6	75	2.9	1.1	2.4
35+	35	74	7	102	20	290	1/2	90	3.5	61	2.4	323	12.8	75	2.9	1.3	2.9
50+	50	106	7	102	20	290	3/4 & 1	110	4.3	99	3.9	374	14.7	75	2.9	1.6	4.2
70+	70	148	7	102	20	290	1	110	4.3	99	3.9	414	16.3	75	2.9	2.1	4.6
130+	130	275	7	102	20	290	1-1/2	140	5.5	105	4.1	520	20.5	100	3.9	4.2	9.3
170+	170	360	7	102	20	290	1-1/2	140	5.5	105	4.1	603	23.7	100	3.9	4.5	9.9
210+	210	445	7	102	20	290	1-1/2	140	5.5	105	4.1	603	23.7	100	3.9	4.6	10.1
310+	310	657	7	102	20	290	2 & 2-1/2	179	7.1	121	4.8	689	27.1	150	5.9	6.9	15.2
425+	425	901	7	102	16	232	3	210	8.3	128	5.1	791	31.1	200	7.9	11.0	24.2
550+	550	1165	7	102	16	232	3	210	8.3	128	5.1	961	37.8	200	7.9	12.6	27.8
550+F	550	1165	7	102	16	232	DN80	370	14.6	190	7.5	1295	51.0	1375	54.1	76.0	167.6
850+F	850	1801	7	102	16	232	DN100	510	20.1	230	9.1	1360	53.5	1500	59.1	141.0	310.9
1100+F	1100	2331	7	102	16	232	DN100	510	20.1	230	9.1	1360	53.5	1500	59.1	143.0	415.3
1400+F	1400	2967	7	102	16	232	DN150	620	24.4	290	11.4	1480	58.3	1560	61.4	210.0	463.0
1800+F	1800	3814	7	102	16	232	DN150	640	25.2	285	11.2	1555	61.2	1640	64.6	176.0	388.0
2200+F	2200	4662	7	102	16	232	DN150	640	25.2	285	11.2	1555	61.2	1640	64.6	178.0	392.4
3000+F	3000	6357	7	102	16	232	DN200	820	32.3	400	15.7	1745	68.7	1710	67.3	420.0	925.9
4000+F	4000	8476	7	102	16	232	DN200	820	32.3	400	15.7	1745	68.7	1710	67.3	428.0	943.6
5000+F	5000	10595	7	102	16	232	DN250	820	32.3	400	15.7	1745	68.7	1710	67.3	432.0	952.4
6000+F	6000	12714	7	102	16	232	DN250	920	32.3	550	18.9	2085	80.3	1625	64	594.0	1034.0
7000+F	7000	14833	7	102	16	232	DN300	920	36.2	550	21.7	2085	82.1	1625	64	597.0	1479.3
8000+F	8000	16952	7	102	16	232	DN300	1040	40.9	525	20.7	2070	81.5	1625	64	1140.0	1984.2



Pressure drop

	DD+ DDh+	DDp+ DDhp+	PD+ PDh+	PDp+ PDhp+	QD+ QDh+
Dry pressure drop (mbar)	N/A	85	N/A	100	140
Wet pressure drop (mbar)	180	N/A	215	N/A	N/A
Max. oil carry-over (mg/m³)	0.07*	N/A	0.008*	N/A	0.003**
Count efficiency (% at MPPS)	N/A	99.92	N/A	99.98	N/A

N/A: Not applicable.
** Inlet oil concentration 10 mg/m³.*
*** After DD+ PD+.*

For other compressed air inlet pressures, multiply the filter capacity by the following correction factors:

Inlet pressure (bar)	1	2	3	4	5	6	7	8	10	12	14	16	18*	20*
Inlet pressure (psig)	15	29	44	58	72.5	87	102	116	145	174	203	232	261	290
Correction factor	0.38	0.53	0.65	0.75	0.83	0.92	1	1.06	1.2	1.31	1.41	1.5	1.57	1.66

** High pressure variants are not available for sizes 425+ and larger.*

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MITSUBISHI ELECTRIC

Mr.SLIM

SPLIT-TYPE AIR CONDITIONERS

INDOOR UNIT

MSY-GE24NA



OPERATING INSTRUCTIONS For user

- To use this unit correctly and safely, be sure to read these operating instructions before use.

English

MANUAL DE INSTRUCCIONES Para los clientes

- Para utilizar esta unidad de forma correcta y segura, lea previamente estas instrucciones de funcionamiento.

Español

NOTICE D'UTILISATION A l'attention des clients

- Pour avoir la certitude d'utiliser cet appareil correctement et en toute sécurité, veuillez lire cette notice d'instructions avant de mettre le climatiseur sous tension.

Français

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SAFETY PRECAUTIONS

- Since rotating parts and parts which could cause an electric shock are used in this product, be sure to read these “Safety Precautions” before use.
- Since the cautionary items shown here are important for safety, be sure to observe them.
- After reading this manual, keep it together with the installation manual in a handy place for easy reference.
- Be sure to receive a guarantee card from your dealer and check that the purchased date and shop name, etc. are entered correctly.

Marks and their meanings

⚠ WARNING : Incorrect handling could cause serious hazard, such as death, serious injury, etc. with a high probability.

⚠ CAUTION : Incorrect handling could cause serious hazard depending on the conditions.

Meanings of symbols used in this manual

- : Be sure not to do.
- : Be sure to follow the instruction.
- : Never insert your finger or stick, etc.
- : Never step onto the indoor/outdoor unit and do not put anything on them.
- : Danger of electric shock. Be careful.
- : Be sure to disconnect the power supply plug from the power outlet.
- : Be sure to shut off the power.

⚠ WARNING

Do not connect the power cord to an intermediate point, use an extension cord, or connect multiple devices to a single AC outlet.
- This may cause overheating, fire, or electric shock.

Make sure the power plug is free of dirt and insert it securely into the outlet.
- A dirty plug may cause fire or electric shock.

Do not bundle, pull, or modify the power cord, and do not apply heat or place heavy objects on it.
- This may cause fire or electric shock.

Do not turn the breaker OFF/ON or disconnect/connect the power plug during operation.
- This may create sparks, which can cause fire.
- After the indoor unit is switched OFF with the remote controller, make sure to turn the breaker OFF or disconnect the power plug.

Do not expose your body directly to cool air for a prolonged length of time.
- This could be detrimental to your health.

The unit should not be installed, relocated, disassembled, altered, or repaired by the user.
- An improperly handled air conditioner may cause fire, electric shock, injury, or water leakage, etc. Consult your dealer.
- If the power supply cord is damaged, it must be replaced by the manufacturer or its service agent in order to avoid a hazard.

When installing, relocating, or servicing the unit, make sure that no substance other than the specified refrigerant (R410A) enters the refrigerant circuit.
- Any presence of foreign substance such as air can cause abnormal pressure rise and may result in explosion or injury.
- The use of any refrigerant other than that specified for the system will cause mechanical failure, system malfunction, or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

Do not insert your finger, a stick, or other objects into the air inlet or outlet.
- This may cause injury, since the fan inside rotates at high speeds during operation.

In case of an abnormal condition (such as a burning smell), stop the air conditioner and disconnect the power plug or turn the breaker OFF.
- A continued operation in the abnormal state may cause a malfunction, fire, or electric shock. In this case, consult your dealer.

When the air conditioner does not cool or heat, there is a possibility of refrigerant leakage. In this case, consult your dealer. If a repair involves recharging the unit with refrigerant, ask the service technician for details.
- The refrigerant used in the air conditioner is safe. Normally, it does not leak. However, if refrigerant leaks and comes in contact with a heat source such as a fan heater, kerosene heater, or cooking stove, it will create a harmful gas.

The user should never attempt to wash the inside of the indoor unit. Should the inside of the unit require cleaning, contact your dealer.
- Unsuitable detergent may cause damage to plastic material inside the unit, which may result in water leakage. Should detergent come in contact with electrical parts or the motor, it will result in a malfunction, smoke, or fire.

SAFETY PRECAUTIONS

⚠ CAUTION

Do not touch the air inlet or the aluminum fins of the indoor/outdoor unit.
- This may cause injury.

Do not use insecticides or flammable sprays on the unit.
- This may cause a fire or deformation of the unit.

Do not expose pets or houseplants to direct airflow.
- This may cause injury to the pets or plants.

Do not place other electric appliances or furniture under the indoor/outdoor unit.
- Water may drip down from the unit, which may cause damage or malfunction.

Do not leave the unit on a damaged installation stand.
- The unit may fall and cause injury.

Do not step on an unstable bench to operate or clean the unit.
- This may cause injury if you fall down.

Do not pull the power cord.
- This may cause a portion of the core wire to break, which may cause overheating or fire.

Do not charge or disassemble the batteries, and do not throw them into a fire.
- This may cause the batteries to leak, or cause a fire or explosion.

Do not operate the unit for more than 4 hours at high humidity (80% RH or more) and/or with windows or outside door left open.
- This may cause the water condensation in the air conditioner, which may drip down, wetting or damaging the furniture.
- The water condensation in the air conditioner may contribute to growth of fungi, such as mold.

Do not use the unit for special purposes, such as storing food, raising animals, growing plants, or preserving precision devices or art objects.
- This may cause deterioration of quality, or harm to animals and plants.

Do not expose combustion appliances to direct airflow.
- This may cause incomplete combustion.

Never put batteries in your mouth for any reason to avoid accidental ingestion.
- Battery ingestion may cause choking and/or poisoning.

Before cleaning the unit, switch it OFF and disconnect the power plug or turn the breaker OFF.
- This may cause injury, since the fan inside rotates at high speeds during operation.

When the unit will be unused for a long time, disconnect the power plug or turn the breaker OFF.
- The unit may accumulate dirt, which may cause overheating or fire.

Replace all batteries of the remote controller with new ones of the same type.
- Using an old battery together with a new one may cause overheating, leakage, or explosion.

If the battery fluid comes in contact with your skin or clothes, wash them thoroughly with clean water.
- If the battery fluid comes in contact with your eyes, wash them thoroughly with clean water and immediately seek medical attention.

Ensure that the area is well-ventilated when the unit is operated together with a combustion appliance.
- Inadequate ventilation may cause oxygen starvation.

Turn the breaker OFF when you hear thunder and there is a possibility of a lightning strike.
- The unit may be damaged if lightning strikes.

After the air conditioner is used for several seasons, perform inspection and maintenance in addition to normal cleaning.
- Dirt or dust in the unit may create an unpleasant odor, contribute to growth of fungi, such as mold, or clog the drain passage, and cause water to leak from the indoor unit. Consult your dealer for inspection and maintenance, which require specialized knowledge and skills.

Do not operate switches with wet hands.
- This may cause electric shock.

Do not clean the air conditioner with water or place an object that contains water, such as a flower vase, on it.
- This may cause fire or electric shock.

Do not step on or place any object on the outdoor unit.
- This may cause injury if you or the object falls down.

❗ IMPORTANT

Dirty filters cause condensation in the air conditioner which will contribute to the growth of fungi such as mold. It is therefore recommended to clean air filters every 2 weeks.

For installation

⚠ WARNING

Consult your dealer for installing the air conditioner.
- It should not be installed by the user since installation requires specialized knowledge and skills. An improperly installed air conditioner may cause water leakage, fire, or electric shock.

Provide a dedicated power supply for the air conditioner.
- A non-dedicated power supply may cause overheating or fire.

Do not install the unit where flammable gas could leak.
- If gas leaks and accumulates around the unit, it may cause an explosion.

Ground the unit correctly.
- Do not connect the ground wire to a gas pipe, water pipe, lightning rod, or a telephone ground wire. Improper grounding may cause electric shock.

⚠ CAUTION

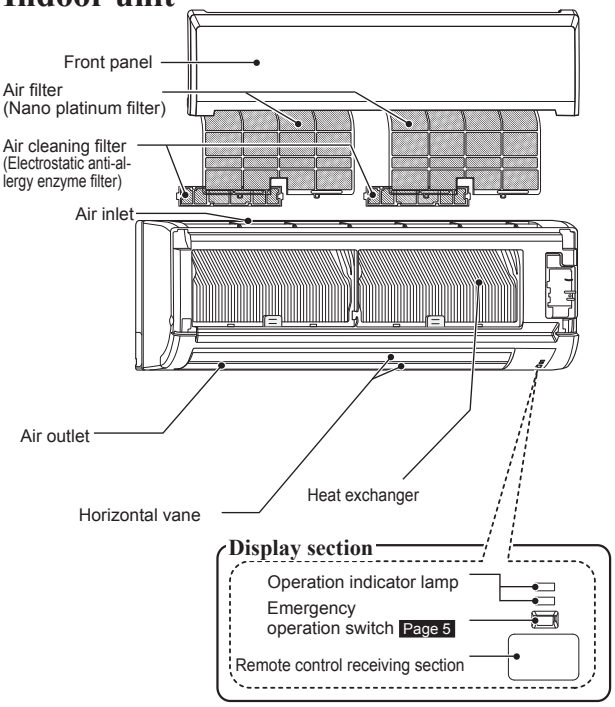
Install a Ground Fault Interrupt (GFI) circuit breaker depending on the installation location of the air conditioner (such as highly humid areas).
- If the Ground Fault Interrupt (GFI) breaker is not installed, it may cause electric shock.

Ensure that the drain water is properly drained.
- If the drain passage is improper, water may drip down from the indoor/outdoor unit, wetting and damaging the furniture.

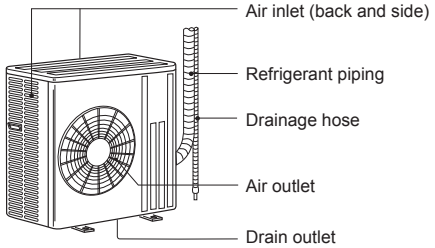
In case of an abnormal condition
Immediately stop operating the air conditioner and consult your dealer.

NAME OF EACH PART

Indoor unit

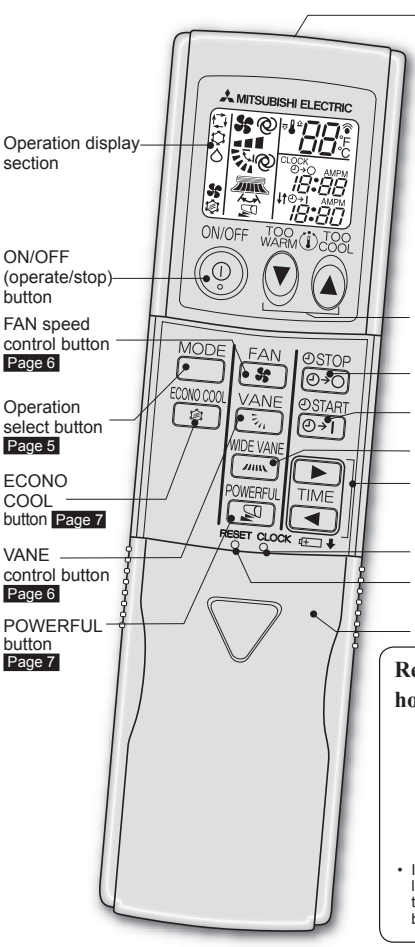


Outdoor unit

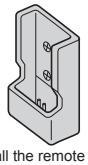


Outdoor units may be different in appearance.

Remote controller



Remote controller holder



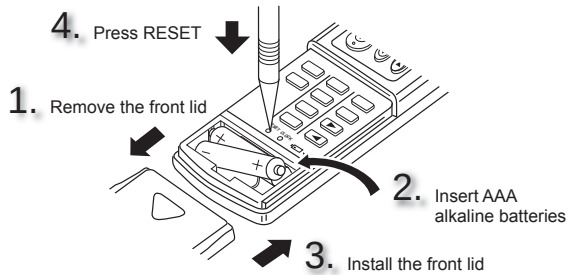
- Install the remote controller holder in a place where the signal can be received by the indoor unit.

Only use the remote controller provided with the unit.
Do not use other remote controllers.
If two or more indoor units are installed in proximity to one another, an indoor unit that is not intended to be operated may respond to the remote controller.

PREPARATION BEFORE OPERATION

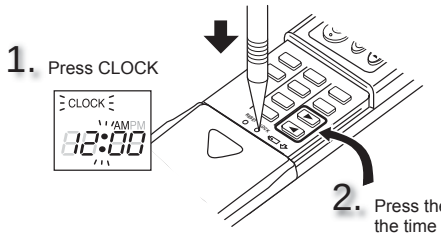
Before operation: Insert the power supply plug into the power outlet and/or turn the breaker on.

Installing the remote controller batteries

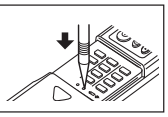


- Make sure the polarity of the batteries is correct.
- Do not use manganese batteries and leaking batteries. The remote controller could malfunction.
- Do not use rechargeable batteries.
- Replace all batteries with new ones of the same type.
- Batteries can be used for approximately 1 year. However, batteries with expired shelf lives last shorter.
- Press RESET gently using a thin instrument.
 If the RESET button is not pressed, the remote controller may not operate correctly.

Setting current time

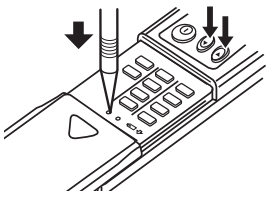


- Press CLOCK gently using a thin instrument.



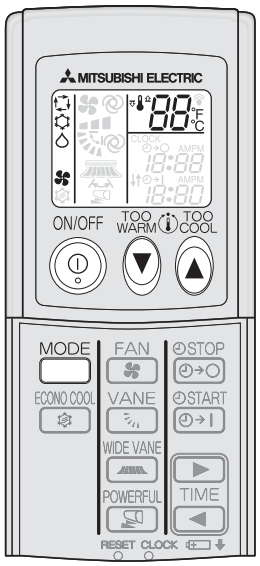
Changing temperature units (˚F→˚C)

Unit is preset with °F.



- Press RESET gently using a thin instrument.
- To change temperature unit from °C to °F, press RESET.

SELECTING OPERATION MODES



1 Press ON/OFF to start the operation.

2 Press MODE to select operation mode. Each press changes mode in the following order:

→ (I FEEL) → (COOL) → (DRY) → (FAN) →

3 Press TOO COOL or TOO WARM to set the temperature.
Each press raises or lowers the temperature by 1°F (1°C).

Press ON/OFF to stop the operation.
- The same setting is selected the next time by simply pressing ON/OFF.

Operation indicator lamp

The operation indicator lamp shows the operation state of the unit.

Indication	Operation state	Room temperature
☀ ☀	The unit is operating to reach the set temperature	About 4°F (2°C) or more away from set temperature
☀ ○	The room temperature is approaching the set temperature	About 2 to 4°F (1 to 2°C) from set temperature

☀ Lighted ○ Not lighted

I FEEL mode

The unit selects the operation mode according to the room temperature when I FEEL is selected. When the room temperature is higher than 77°F (25°C), COOL is selected (set temperature: 75°F [24°C]). When the room temperature is lower than 77°F (25°C), DRY is selected. However, when operation is stopped and then started within 2 hours, the mode which has been selected previously is operated.

Note:

During COOL operation, the set temperature may not be changed when the room temperature is more than 4°F (2°C) higher than the set temperature. In this case, please wait until the room temperature drops to within 4°F (2°C) of the set temperature.

COOL mode

Enjoy cool air at your desired temperature.

Note:

Do not operate COOL mode at very low outside temperatures (less than 0°F [-17.8°C]). Water condensed in the unit may drip and wet or damage furniture, etc.

DRY mode

Dehumidify your room. The room may be cooled slightly.
Temperature cannot be set during DRY mode.

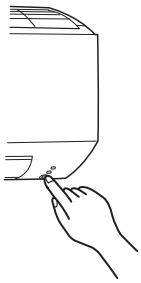
FAN mode

Circulate the air in your room.

Emergency operation

When the remote controller cannot be used...

Emergency operation can be activated by pressing the emergency operation switch (E.O.SW) on the indoor unit.



Each time the E.O.SW is pressed, the operation changes in the following order:

Operation indicator lamp

☀ ○ Emergency COOL
↓
○ ○ Stop

Set temperature : 75°F (24°C)
Fan speed : Medium
Horizontal vane : Auto

Note:

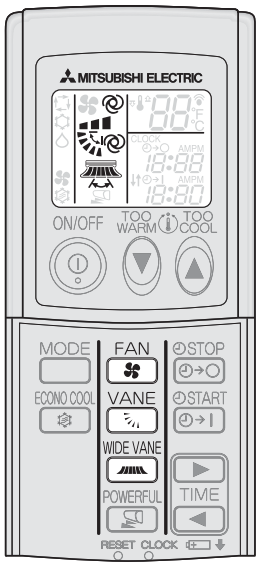
The first 30 minutes of operation is test run. Temperature control does not work, and fan speed is set to High.

Auto restart function

If a power failure occurs or the main power is turned off during operation, "Auto restart function" automatically starts operation in the same mode as the one set **with the remote controller** just before the shutoff of the main power. When timer is set, timer setting is cancelled and the unit starts operation when power is resumed.

If you do not want to use this function, please consult the service representative because the setting of the unit needs to be changed.

FAN SPEED AND AIRFLOW DIRECTION ADJUSTMENT



FAN

Press [] to select fan speed. Each press changes fan speed in the following order:

(AUTO) → (Low) → (Med.) → (High)

- Two short beeps are heard from the indoor unit when set to AUTO.
- Use higher fan speed to cool the room quicker. It is recommended to lower the fan speed once the room is cool.
- Use lower fan speed for quiet operation.

VANE

Press [] to select airflow direction. Each press changes airflow direction in the following order:

(AUTO) → (1) → (2) → (3) → (4) → (5) → (SWING)

- Two short beeps are heard from the indoor unit when set to AUTO.

WIDE VANE

Press [] to select horizontal airflow direction. Each press changes airflow direction in the following order:

→ (SWING)

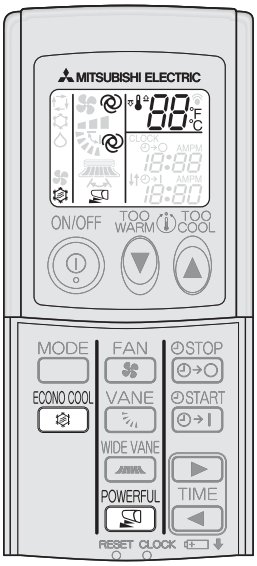
Airflow direction

(AUTO).....The vane is set to the most efficient airflow direction. :horizontal position.

(Manual).....For efficient air conditioning, select the upper position for COOL/DRY, and the lower position for FAN. If the position (4) or (5) is selected during COOL/DRY, the vane automatically moves to the horizontal position after 0.5 to 1 hour to prevent any condensation from dripping.

(Swing).....The vane moves up and down intermittently.

ECONO COOL OPERATION



ECONO COOL

Press [ECONO COOL] during COOL mode page 5 to start ECONO COOL operation.

The unit performs swing operation vertically in various cycle according to the temperature of the unit. Set temperature is set 4°F (2°C) higher automatically.

ECONO COOL

Press [ECONO COOL] again to cancel ECONO COOL operation.

- ECONO COOL operation also is cancelled when the VANE or POWERFUL button is pressed.

What is "ECONO COOL"?

Swing air flow (change of air flow) makes you feel cooler than constant air flow. So, even though the set temperature is automatically set 4°F (2°C) higher, it is possible to perform cooling operation with keeping comfort. As a result, energy can be saved.

POWERFUL OPERATION

POWERFUL

Press [POWERFUL] during COOL mode page 5 to start POWERFUL operation.

Fan speed : Exclusive speed for POWERFUL mode
Horizontal vane : Set position, or downward airflow position during AUTO setting

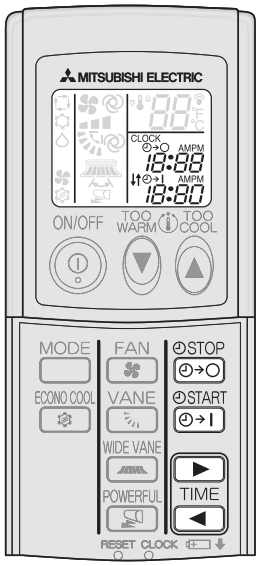
- Temperature cannot be set during POWERFUL operation.

POWERFUL

Press [POWERFUL] again to cancel POWERFUL operation.

- POWERFUL operation also is cancelled automatically in 15 minutes, or when the ON/OFF, FAN, or ECONO COOL button is pressed.

TIMER OPERATION (ON/OFF TIMER)



1 Press [START] or [STOP] during operation to set the timer.

[START] (ON timer) : The unit will turn ON at the set time.

[STOP] (OFF timer) : The unit will turn OFF at the set time.

*** ⏲→I or ⏲→○ blinks.**

*** Make sure that the current time is set correctly.** Page 4

2 Press [►] (Increase) and [◄] (Decrease) to set the time of timer.

Each press increases or decreases the set time by 10 minutes.

- Set the timer while ⏲→I or ⏲→○ is blinking.

Press [START] or [STOP] again to cancel timer.

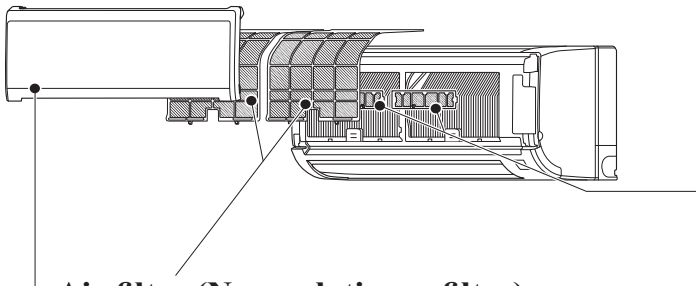
Note:

- ON and OFF timers can be set together. ⇵ mark indicates the order of timer operations.
- If power failure occurs while ON/OFF timer is set, see page 5 "Auto restart function".

CLEANING

Instructions:

- Switch off the power supply or turn off the breaker before cleaning.
- Be careful not to touch the metal parts with your hands.
- Do not use benzine, thinner, polishing powder, or insecticide.
- Use only diluted mild detergents.
- Do not expose parts to direct sunlight, heat, or fire to dry.
- Do not use water hotter than 120°F (50°C).



Air filter (Nano platinum filter)

- Clean every 2 weeks
- Remove dirt by a vacuum cleaner, or rinse with water.
- After washing with water, dry it well in shade.

What is “Nano platinum filter”?

Nano platinum is a ceramic particle that includes a platinum nanoparticle. The particles are incorporated into the filter material, which results in providing semi-permanent antibacterial and deodorizing characteristics for the filter. Nano platinum surpasses the catechin (a bioflavonoid that is found in green tea) in performance. Nano platinum filter uses this compound not only to improve air quality but also to eliminate bacteria and viruses. This air filter has a semi-permanent lasting effect even after washing it with water.

Air cleaning filter (Electrostatic anti-allergy enzyme filter)

Every 3 months:

- Remove dirt by a vacuum cleaner.

When dirt cannot be removed by vacuum cleaning:

- Soak the filter and its frame in lukewarm water before rinsing it.
- After washing, dry it well in shade.

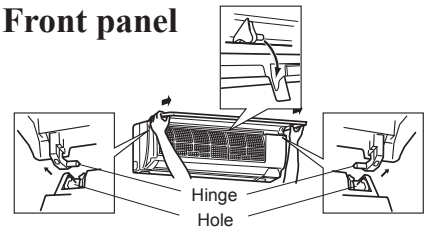
Every year:

- Replace it with a new air cleaning filter for best performance.
- Parts Number MAC-2310FT-E

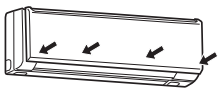
Important

- Clean the filters regularly for best performance and to reduce power consumption.
- Dirty filters cause condensation in the air conditioner which will contribute to the growth of fungi such as mold. It is therefore recommended to clean air filters every 2 weeks.

Front panel



1. Lift the front panel until a “click” is heard.
2. Hold the hinges and pull to remove as shown in the left illustration.
 - Wipe with a soft dry cloth or rinse it with water.
 - Do not soak it in water for more than two hours.
 - Dry it well in shade.
3. Install the front panel by following the removal procedure in reverse. Close the front panel securely and press the positions indicated by the arrows.



WHEN YOU THINK THAT TROUBLE HAS OCCURRED

Even if these items are checked, when the unit does not recover from the trouble, stop using the air conditioner and consult your dealer.

Symptom	Explanation & Check points
Indoor Unit	
The unit cannot be operated.	• Is the breaker turned on? • Is the power supply plug connected? • Is the ON timer set? Page 7
The unit cannot be operated for about 3 minutes when restarted.	• This protects the unit according to instructions from the microprocessor. Please wait.
Mist is discharged from the air outlet of the indoor unit.	• The cool air from the unit rapidly cools moisture in the air inside the room, and it turns into mist.
The swing operation of the HORIZONTAL / VERTICAL VANE is suspended for a while, then restarted.	• This is for the swing operation of the HORIZONTAL / VERTICAL VANE to be performed normally.
The air flow direction changes during operation. The direction of the horizontal vane cannot be adjusted with the remote controller.	• When the unit is operated in COOL or DRY mode, if the operation continues with air blowing down for 0.5 to 1 hour, the direction of the air flow is automatically set to horizontal position to prevent water from condensing and dripping.
The unit starts operation by itself when the main power is turned on, though it isn't operated with the remote controller.	• These models are equipped with an auto restart function. When the main power is turned off without stopping the unit with the remote controller and is turned on again, the unit starts operation automatically in the same mode as the one set with the remote controller just before the shutoff of the main power. Refer to "Auto restart function" page 5.
The indoor unit discolors over time.	• Although plastic turns yellow due to the influence of some factors such as ultraviolet light and temperature, this has no effect on the product functions.
Outdoor Unit	
The fan of the outdoor unit does not rotate even though the compressor is running. Even if the fan starts to rotate, it stops soon.	• When the outside temperature is low during cooling operation, the fan operates intermittently to maintain sufficient cooling capacity.
Water leaks from the outdoor unit.	• During COOL and DRY operations, pipe or pipe connecting sections are cooled and this causes water to condense.
Remote controller	
The display on the remote controller does not appear or it is dim. The indoor unit does not respond to the remote control signal.	• Are the batteries exhausted? Page 4 • Is the polarity (+, -) of the batteries correct? Page 4 • Are any buttons on the remote controller of other electric appliances being pressed?
Does not cool	
The room cannot be cooled sufficiently.	• Is the temperature setting appropriate? Page 5 • Is the fan setting appropriate? Please change fan speed to higher setting. Page 6 • Are the filters clean? Page 8 • Is the fan or heat exchanger of the indoor unit clean? • Are there any obstacles blocking the air inlet or outlet of the indoor or outdoor unit? • Is a window or door open? • When a ventilation fan or a gas cooker is used in a room, the cooling load increases, resulting in an insufficient cooling effect. • When the outside temperature is high, the cooling effect may not be sufficient.

Symptom	Explanation & Check points
Airflow	
The air from the indoor unit smells strange.	• Are the filters clean? Page 8 • Is the fan or heat exchanger of the indoor unit clean? • The unit may suck in an odor adhering to the wall, carpet, furniture, cloth, etc. and blow it out with the air.
Sound	
Cracking sound is heard.	• This sound is generated by the expansion/contraction of the front panel, etc. due to change in temperature.
"Burbling" sound is heard.	• This sound is heard when the outside air is absorbed from the drain hose by turning on the range hood or the ventilation fan, making water flowing in the drain hose to spout out. This sound is also heard when the outside air blows into the drain hose in case the outside wind is strong.
Mechanical sound is heard from the indoor unit.	• This is the switching sound in turning on/off the fan or the compressor.
The sound of water flowing is heard.	• This is the sound of refrigerant or condensed water flowing in the unit.

In the following cases, stop using the air conditioner and consult your dealer.

- When water leaks or drips from the indoor unit.
- When the upper operation indicator lamp blinks.
- When the breaker trips frequently.
- The remote control signal is not received in a room where an electronic ON/OFF type fluorescent lamp (inverter-type fluorescent lamp, etc.) is used.
- Operation of the air conditioner interferes with radio or TV reception. An amplifier may be required for the affected device.
- When an abnormal sound is heard.

WHEN THE AIR CONDITIONER IS NOT GOING TO BE USED FOR A LONG TIME

1 Set to the highest temperature in manual COOL mode, and operate for 3 to 4 hours. Page 5
- This dries the inside of the unit.
- Moisture in the air conditioner contributes to favorable conditions for growth of fungi, such as mold.

2 Press ON/OFF to stop the operation.

3 Turn off the breaker and/or disconnect the power supply plug.

4 Remove all batteries from the remote controller.

When using the air conditioner again:

1 Clean the air filters. Page 8

2 Check that the air inlet and outlet of the indoor and outdoor units are not blocked.

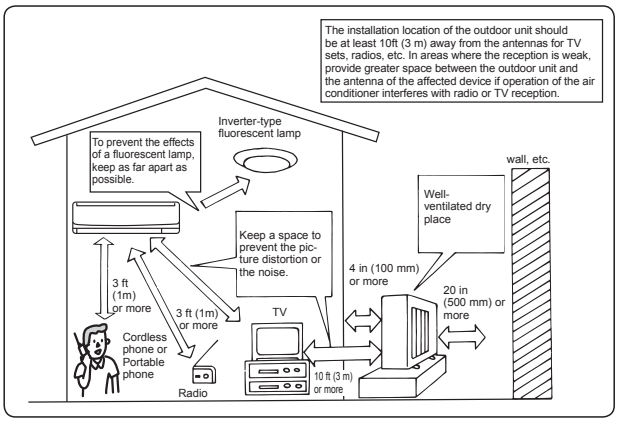
3 Check that the ground wire is connected correctly.

4 Refer to the “PREPARATION BEFORE OPERATION”, and follow the instructions. Page 4

INSTALLATION PLACE AND ELECTRICAL WORK

Installation place

Avoid installing the air conditioner in the following places.
- Where there is much machine oil.
- Salty places such as the seaside.
- Where sulfide gas is generated such as a hot spring.
- Where oil is splashed or where the area is filled with oily smoke.
- Where there is high-frequency or wireless equipment.
- Where the air from the outdoor unit air outlet is blocked.
- Where the operation sound or air from the outdoor unit does not bother the house next door.



Electrical work

- Provide an exclusive circuit for the power supply of the air conditioner.
- Be sure to observe the breaker capacity.

If you have any questions, consult your dealer.

SPECIFICATIONS

Guaranteed operating range

		Indoor	Outdoor
Cooling	Upper limit	90°F (32.2°C) DB	115°F (46.1°C) DB
		73°F (22.8°C) WB	—
	Lower limit	67°F (19.4°C) DB	0°F (-17.8°C) DB
		57°F (13.9°C) WB	—

DB : Dry Bulb
WB: Wet Bulb

Note:

1. The guaranteed operating range value is for 1:1 System Application.
2. If the outdoor temperature is below the lower limit of guaranteed operating range, the outdoor unit may stop operation until the outdoor temperature exceeds the lower limit.

MITSUBISHI ELECTRIC

HVAC Advanced Products Division

Mr. SLIM®

Split Zoning A/C and Heat Pumps

SUBMITTAL DATA: MSY-GE24NA & MUY-GE24NA. 24,000 BTU/H WALL-MOUNTED AIR-CONDITIONING SYSTEMS

Job Name: Location: Date:

Purchaser: Engineer:

Submitted to: For ☐ Reference ☐ Approval ☐ Construction

Unit Designation: Schedule No.:

GENERAL FEATURES

- Wall-mounted indoor unit
- Nano Platinum and and Anti-allergy Enzyme filters are include
- Quiet operation
- Choice of fan speeds: Low, Medium, High, and Powerful
- Wireless handheld remote controller is included; PAR-21MAA wired remote controller can be installed as an option
- Indoor unit powered from outdoor unit using A-Control
- Auto restart following a power outage
- Limited warranty: five years on parts and defects and seven y ars on the compressor

OPTIONAL ACCESSORIES

Outdoor Unit

☐ Three-pole Disconnect Switch (TAZ-MS303)
☐ Air Outlet Guide (MAC-856SG)
☐ Mounting Base (DSD-400N)
☐ Mounting Pad (ULTRILITE1)

Indoor Unit

☐ Condensate Pump (SI3100-230; 230V)
☐ Replacement Anti-allergy Enzyme Filters (MAC-2310FT-E; 2/set)

Controller Options

☐ Wall-mounted Wired Controller (PAR-21MAA; req. MAC-3971F)
☐ MA Contact Terminal Interface (MAC-397IF)
☐ M-NET Control Adapter (MAC-399IF)
☐ Remote Temperature Sensor (M21-JKO-307)
☐ Lockdown Bracket for Handheld Controller (RCMKP1CB)



Indoor Unit: MSY-GE24NA



Outdoor Unit: MUY-GE24NA

ENERGY STAR



Wireless Handheld Remote Controller

Indoor Unit

MCA 1 A
Fan Motor 0.76 F.L.A.
Airflow (Lo - Med - Hi - Powerful
Cooling 388 - 469 - 628 - 738 Dry CFM
347 - 420 - 562 - 661 Wet CFM

Sound Pressure Level (Lo - Med - Hi - Powerful)
Cooling 34 - 41 - 49 - 53 dB(A)

DIMENSIONS	UNIT INCHES / MM
W	43-5/16 / 1,116
D	9-3/8 / 238
H	12-13/16 / 325

Weight. 37 lbs. / 17 kg
Moisture Removal. 2.7 pt./h
External Finish Munsell No. 1.0Y 9.2 / 0.2
Field Drainpipe Size O.D. 5/8" / 15.88 mm
Remote Controller Wireless Handheld
(Optional Wired Remote Controller PAR-21MAA; see Data Submittal Sheet)

Outdoor Unit

Compressor DC Inverter-driven Twin Rotary
MCA 17.1 A
Fan Motor 0.93 F.L.A.
Sound Pressure Level (Cooling). 55 dB(A)

DIMENSIONS	INCHES / MM
W	33-1/16 + 3-3/16 / 840 + 81
D	13 / 330
H	34-5/8 / 880

Weight 119 lbs. / 54 kg
External Finish Munsell No. 3Y 7.8 / 1.1

Refrigerant Type R410A
Refrigerant Pipe Size O.D.
Gas Side 5/8" / 15.88 mm
Liquid Side. 3/8" / 6.35 mm
Max. Refrigerant Pipe Length. 100' / 30 m
Max. Refrigerant Pipe Height Difference 50' / 15 m
Connection Method Flared

Cooling*

Rated Capacity 22,500 Btu/h
Minimum to Maximum Capacity Range 8,200 - 31,400 Btu/h
SEER 19.0 Btu/h/W
EER 12.5 Btu/h/W
Total Rated Input 1,800 W

* Rating Conditions (Cooling) - Indoor: 80°F (27°C) DB, 67°F (19°C) WB; Outdoor: 95°F (35°C) DB, 75°F (24°C) WB.

Electrical Requirements

Power Supply 208 / 230V, 1-Phase, 60 Hz
Breaker Size 20 A

Voltage

Indoor - Outdoor S1-S2 AC 208 / 230V
Indoor - Outdoor S2-S3 DC 12-24V
Indoor - Remote Controller Wireless

OPERATING CONDITIONS

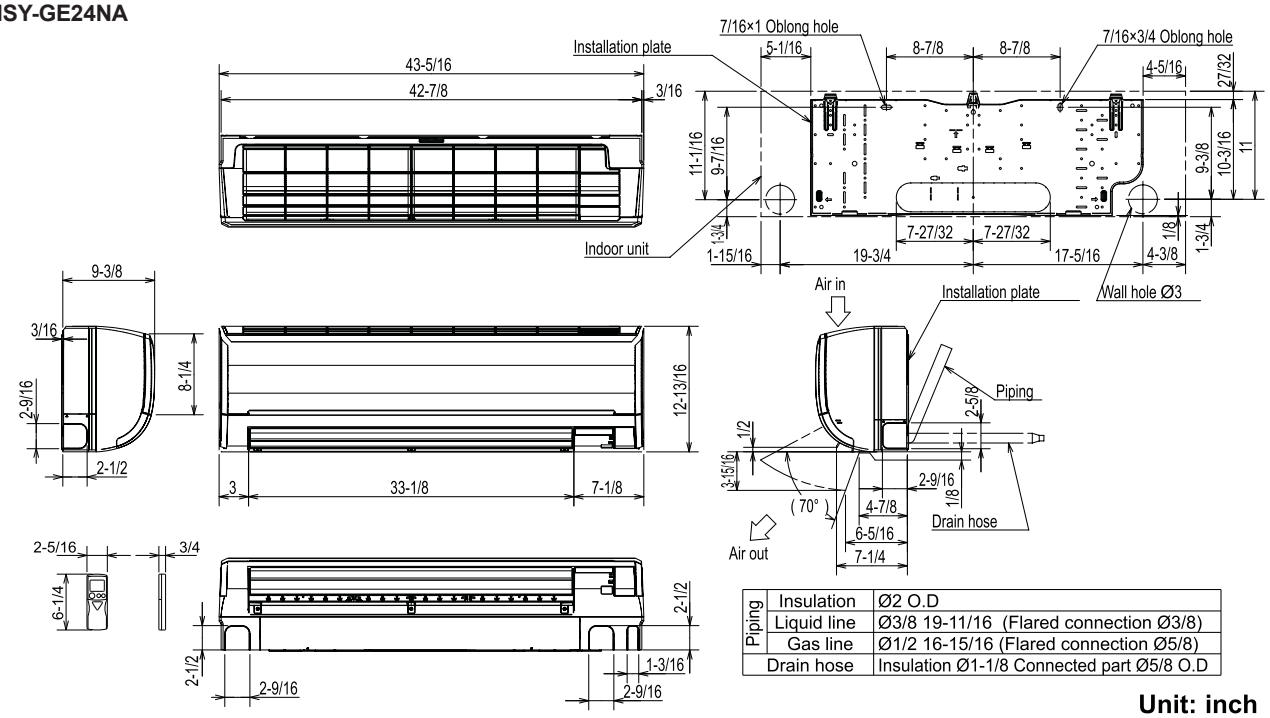
		Indoor Intake Air Temp.	Outdoor Intake Air Temp.
Cooling	Maximum	90°F (32°C) DB, 73°F (23°C) WB	115°F (46°C) DB
	Minimum	67°F (19°C) DB, 57°F (14°C) WB	14°F (-10°C) DB

R410A

INVERTER

DIMENSIONS: MSY-GE24NA & MUY-GE24NA

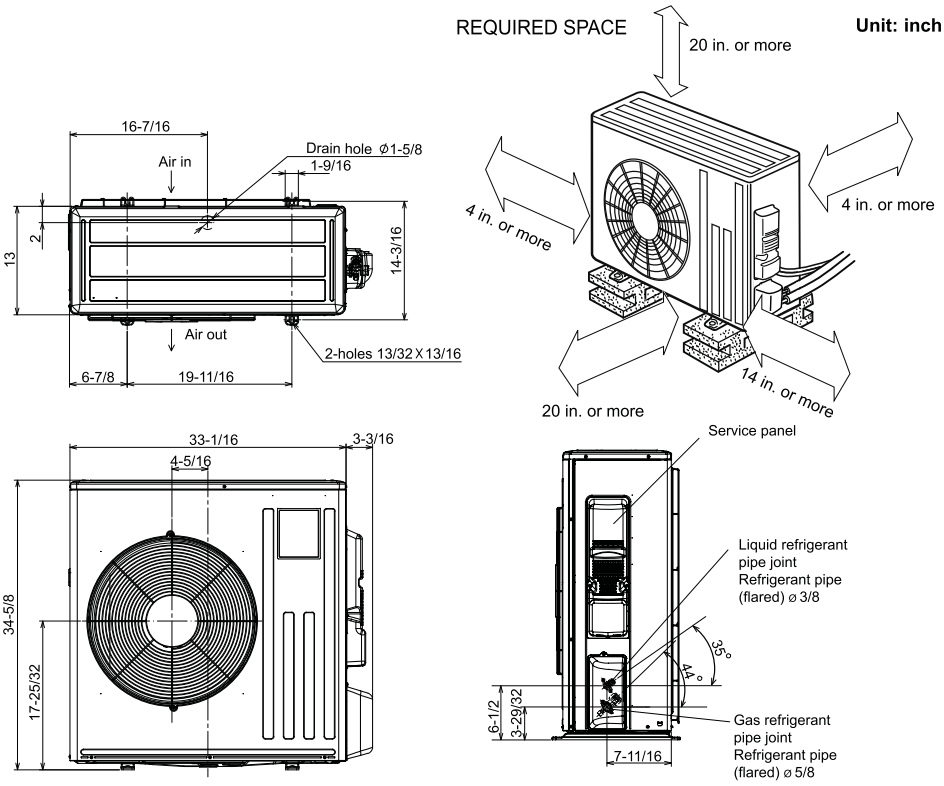
MSY-GE24NA



Piping		
	Insulation	Ø2 O.D
	Liquid line	Ø3/8 19-11/16 (Flared connection Ø3/8)
	Gas line	Ø1/2 16-15/16 (Flared connection Ø5/8)
	Drain hose	Insulation Ø1-1/8 Connected part Ø5/8 O.D

Unit: inch

MUY-GE24NA



AHRI CERTIFIED™ www.ahridirectory.org
Unitary Small AC
AHRI Standard 210/240
Certification applies only when the complete system is listed with AHRI.

ETL LISTED®

ENERGY STAR PARTNER

MITSUBISHI ELECTRIC

HVAC Advanced Products Division
3400 Lawrenceville Suwanee Rd
Suwanee, GA 30024
Tele: 678-376-2900 • Fax: 800-889-9904
Toll Free: 800-433-4822 (#3)
www.mehvac.com

Specifications are subject to change without notice.

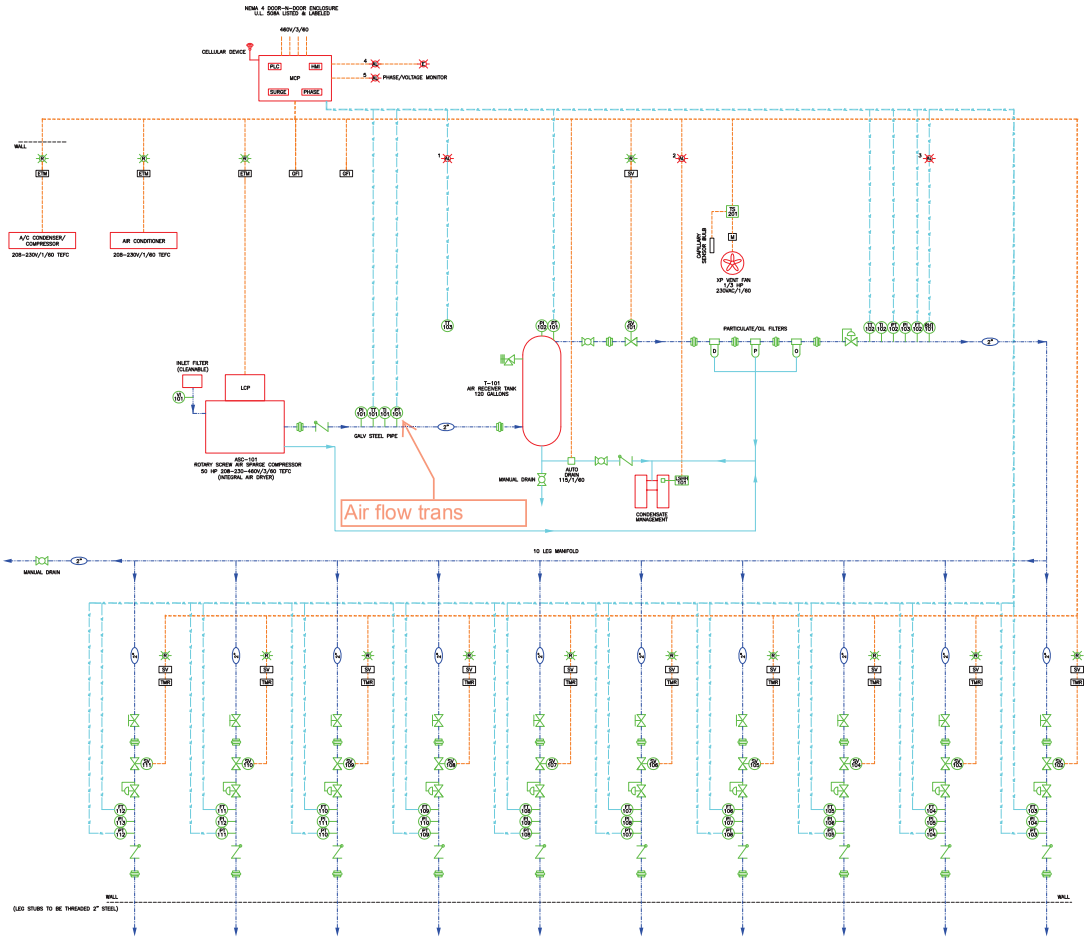
 © MITSUBISHI ELECTRIC / HVAC 2010

MAE²

MID-ATLANTIC ENVIRONMENTAL EQUIPMENT

SECTION 2:

SYSTEM DRAWINGS



LEGEND

DPI	DIFFERENTIAL PRESSURE INDICATOR
EDS	TELEMETRY UNIT
ETM	ELAPSED TIME METER
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FIT	FLOW INDICATING TRANSMITTER
FM	FLOW METER
FP	FLOW PORT
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH HIGH
LSL	LEVEL SWITCH LOW
M	MOTOR
MS	MOTOR SAVER
MCP	MASTER CONTROL PANEL
PI	PRESSURE INDICATOR
PSL	PRESSURE SWITCH LOW
PT	PRESSURE TRANSMITTER
SP	SAMPLE PORT
SV	SOLENOID VALVE
TI	TEMPERATURE INDICATOR
TSH	TEMPERATURE SWITCH HIGH
TT	TEMPERATURE TRANSMITTER
T	TIMER
VI	VACUUM INDICATOR
	BALL VALVE
	BUTTERFLY VALVE
	CAMLOCK FITTING
	CHECK VALVE
	FLOW PORT CAPPED
	GATE VALVE
	GLOBE VALVE
	RAIN CAP
	REGULATOR
	RELIEF VALVE
	ROTAMETER
	SOLENOID VALVE
	UNION
	WYE STRAINER
	ALARM LIGHT
	EMERGENCY STOP LIGHT
	RUN LIGHT
	AIR LINE
	BREAK
	CONTROL LINE
	INTRINSICALLY SAFE LINE
	INTRINSICALLY SAFE ANALOG LINE
	NON-INTRINSICALLY SAFE ANALOG LINE
	PRODUCT LINE
	WATER LINE

ALARMS

1. INTERIOR HIGH TEMPERATURE ALARM
2. HIGH HIGH CONDENSATE LEVEL ALARM
3. HIGH RELATIVE HUMIDITY ALARM
4. EMERGENCY STOP
5. PHASE MONITOR ALARM

REV.	DESCRIPTION	DATE	APPR.
2	AS BUILT – COMPREHENSIVE REDRAW	1/5/14	GWL
1			

REVISIONS

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MAE2

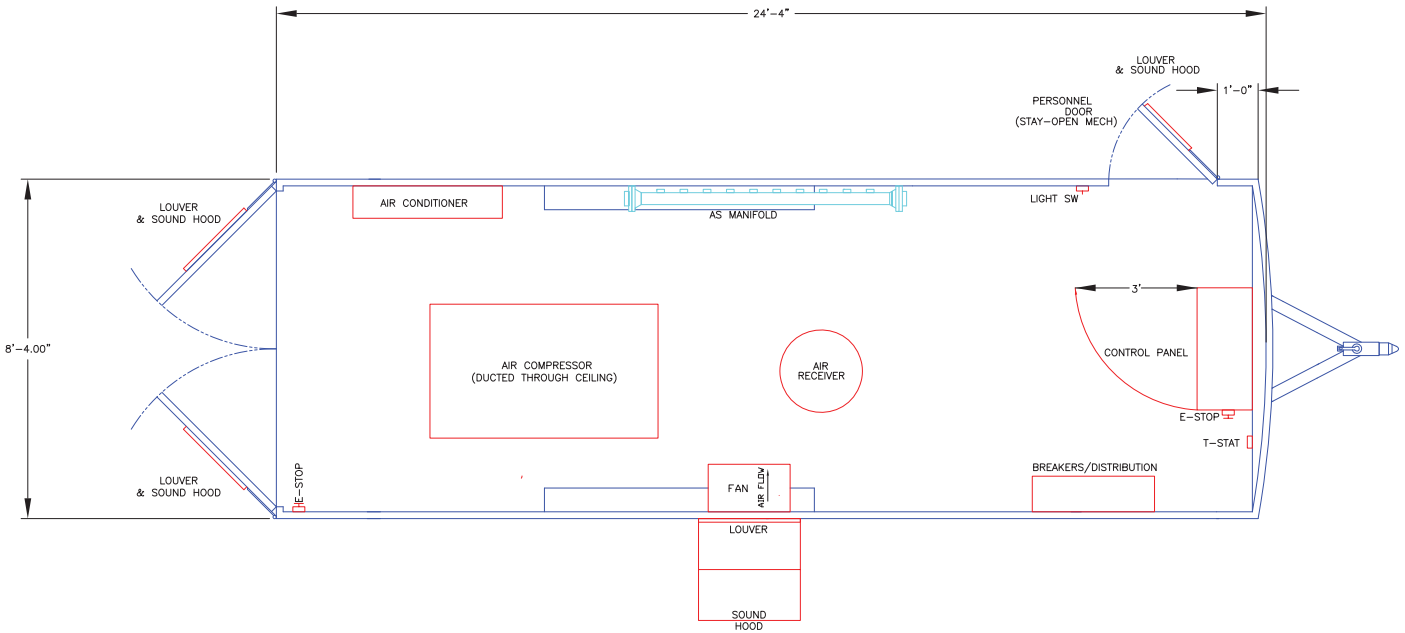
DRWN BY	DATE
JWF	9/8/14
CHK BY	DATE
APPR BY	DATE

TITLE: AIR SPARGE SYSTEM
PROCESS & INSTRUMENTATION DIAGRAM

KENNEDY SPACE CENTER — JOB NO.

SCALE	SIZE	DWG NO.	SHEET	REV
N/A			1	2

REVISIONS			
REV	DESCRIPTION	DATE	APPR
1			
2			
3			



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DRWN BY	JWF
DATE	9/12/14
CHK BY	
DATE	
APPR BY	
DATE	

MID-ATLANTIC ENVIRONMENTAL EQUIPMENT, INC.
155 Oak Forest Road
Bluffton, SC 29910
Tel: (843) 706-5659

TITLE
MOBILE AIR SPARGE SYSTEM
TRAILER LAYOUT

TETRATECH – KENNEDY SPACE CENTER

JOB NO.

SCALE	SIZE	DWG NO.	SHEET	REV
1"=30"	C		1 OF 1	PRELIM

MAE²

MID-ATLANTIC ENVIRONMENTAL EQUIPMENT

SECTION 3:

INSTRUMENTATION

ProSense® TTD25 Series Temperature Transmitter



TTD25N



TTD25C

Features

- High accuracy 2-wire temperature transmitter
- 1000 ohm, Class A platinum RTD sensing element
- 4-20mA analog output signal
- Probes made of durable 316 stainless steel
- Temperature ranges of 0-100°C or 0-300°F

Agency Approvals

- cULus File number E 324411
- CE
- RoHS

ProSense Temperature Transmitter Series						
Part Number	**Description**	**Pcs/Pkg**	**Wt(lb)**	**Price**	**Use With**	**Cable Assemblies**
TTD25N-20-0100C-H	4-20 mA output, 8.3 mm (0.3") dia. probe, 1/4" NPT male port, 4-pin micro M12 plug. Temperature range: 0 to 100°C.	1	0.30	<--->	N/A	CD12L-0B-020-A0 CD12L-0B-020-C0 CD12M-0B-070-A1 CD12M-0B-070-C1 CDP12-0B-010-AA CDP12-0B-030-AA CDP12-0B-010-BB CDP12-0B-030-BB (order separately - See Proximity Sensor section for cable specs)
TTD25N-20-0300F-H	4-20 mA output, 8.3 mm (0.3") dia. probe, 1/4" NPT male port, 4-pin micro M12 plug. Temperature range: 0 to 300°F .	1	0.30	<--->	N/A	
TTD25C-20-0100C-H	4-20 mA output, 6 mm (0.24") dia. probe, 4-pin micro M12 plug. Temperature range: 0 to 100°C.	1	0.30	<--->	CF06-25N	
TTD25C-20-0300F-H	4-20 mA output, 6 mm (0.24") dia. probe, 4-pin micro M12 plug. Temperature range: 0 to 300°F.	1	0.32	<--->	CF06-25N	

ProSense TTD25 Series Technical Specifications				
	TTD25N-20-0100C-H	**TTD25N-20-0300F-H**	**TTD25C-20-0100C-H**	**TTD25C-20-0300F-H**
Operating Voltage	10 to 30 VDC			
Electrical Connection	M12 connector; gold-plated contacts			
Process connection	1/4" MNPT		Use CF06-25N	
Short-Circuit Protection	Yes (non-latching)			
Overload Protection	Yes			
Reverse Polarity Protection	Yes			
Analog Output	4 to 20 mA (min/max 3.85 to 22 mA)			
Maximum Load	720Ω at 24 VDC; Rmax = (Supply voltage - 9.6)*50			
Pressure Rating	4350 psi (300 bar)		725 psi (50 bar) (This value applies to the sensor only. For installation in adapters, use the adapter data sheet indications)	
Accuracy	± 0.3°C	± 0.4°C	± 0.3°C	± 0.4°C
Resolution	<0.02°C			
Measuring Element	1 x Pt 1000, to DIN EN 60751, class A			
Measuring Range	32 to 212°F (0 to 100°C)	0 to 300°F (-17.8 to 148.9°C)	32 to 212°F (0 to 100°C)	0 to 300°F (-17.8 to 148.9°C)
Dynamic Response (DIN EN 60751)	*$t_{0.5}$ = 1 sec/ $t_{0.9}$ = 3 sec		*$t_{0.5}$ = 1 sec/ $t_{0.9}$ = 3 sec	
Minimum Installation Depth	N/A		0.6 in (15 mm)	
Housing Material	Stainless steel (316S12); stainless steel (304S15); stainless steel (303S22); PA			
Materials (wetted parts)	Stainless steel (316S12)			
Ambient Temperature	–13 to 158°F (–25 to 70°C)			
Storage Temperature	–40 to 212°F (–40 to 100°C)			
Protection	IP 68 / IP 69K, Class III			
Insulation Resistance	> 100 MΩ (500 VDC)			
Shock Resistance	50g (DIN / IEC 68-2-27, 11ms)			
Vibration Resistance	20g (DIN / EN 68-2-6, (10 to 2000 Hz)			
EMC				
EN 61000-4-2 ESD	4 kV CD/8 kV AD			
EN 61000-4-3 HF Radiated	10 V/m			
EN 61000-4-4 Burst	2 kV			
EN 61000-4-5 Surge	1 kV			
EN 61000-4-6 HF Conducted	10 V			

** $t_{0.5}$ = a 50% of full scale change in output when immersed in water at 0.4m/s, $t_{0.9}$ = a 90% FS change.*

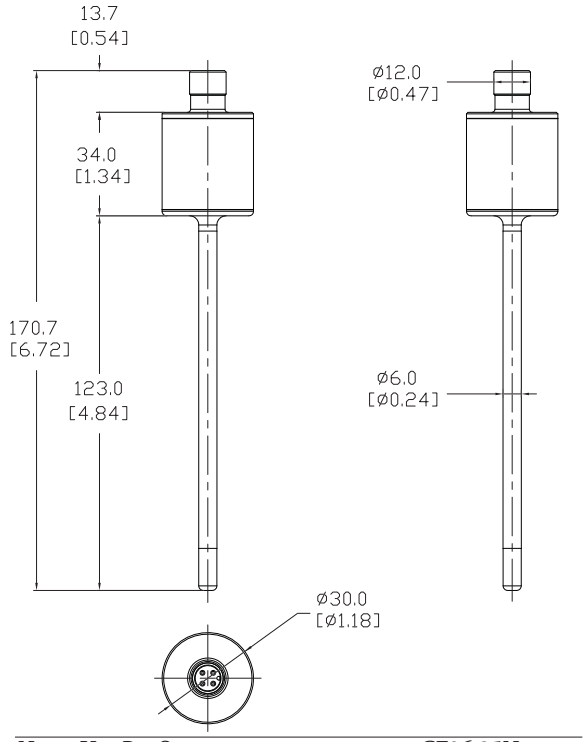
NOTE: CHECK THE CHEMICAL COMPATIBILITY OF THE SENSOR'S WETTED PARTS WITH THE MEDIUM TO BE MEASURED.
www.automationdirect.com/static/specs/prosensechemresistance.pdf

TTD25C series may be used with RTDTW-10-010-50N Thermowell & CF06-25N fitting when isolation is required. Please refer to "Thermowells for RTD Probes with M12 Cable Connector" pages for further information.

ProSense® TTD25 Temperature Transmitters

TTD25C Series Dimensions

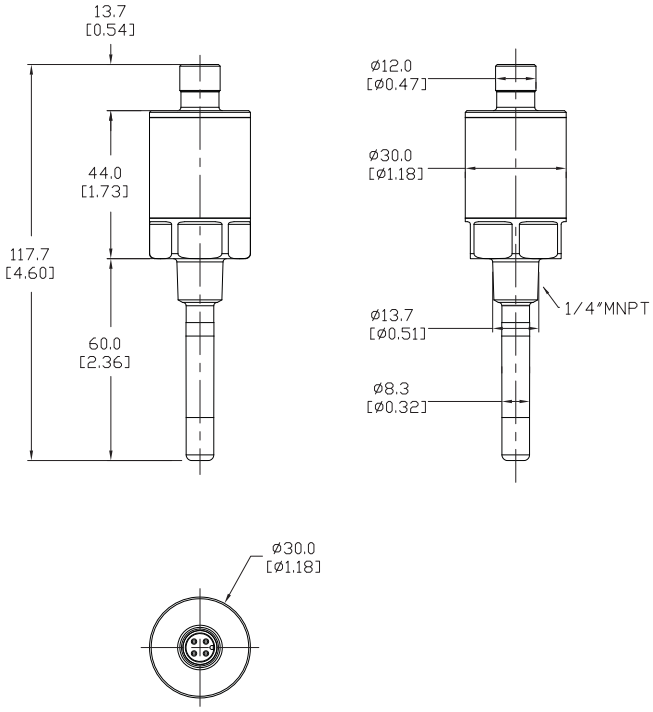
mm [inches]



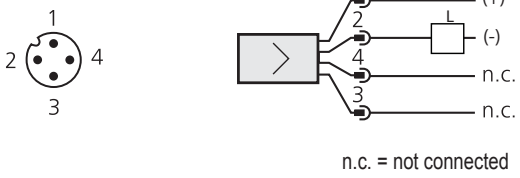
NOTE: USE PROSENSE COMPRESSION FITTING CF06-25N TO MOUNT TTD25C SERIES TEMPERATURE TRANSMITTER.

TTD25N Series Dimensions

mm [inches]



Wiring Diagram



Cable Assembly Wiring Colors:
Pin 1 - Brown
Pin 2 - White
Pin 3 - Blue
Pin 4 - Black

Note: wiring colors are based on AutomationDirect CD12L and CD12M 4-pole cable assemblies.

Sensor Cables and Connectors

Cables with quick-disconnect plugs

- Industry standard axial and right-angle M8/M12 screw-lock connectors with open leads. The cables listed can be used with patch cables
- 2m, 5m, 7m and 10m cable lengths
- PVC (polyvinyl chloride) jacket for typical industrial applications
- PUR (polyurethane) jacket for oily and direct sunlight applications
- IP67 rated









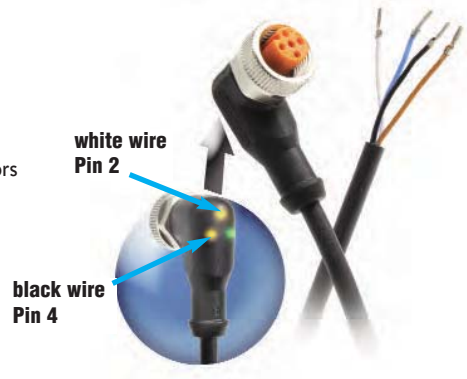
CD12M-0B-050-C1 and -A1 shown

M8 Quick-Disconnect Cables (Pico, Nano)							
Part Number	**Price**	**Length**	**Poles**	**Connector**	**LED**	**Jacket**	**Dimensions**
M8 Quick-Disconnects							
CD08-0A-020-A1	<--->	2m (6.5ft.)	3	Axial	No	PVC	Figure 1
CD08-0A-020-C1	<--->	2m (6.5ft.)	3	Right-angle	No	PVC	Figure 2
CD08-0A-050-A1	<--->	5m (16.4ft.)	3	Axial	No	PVC	Figure 4
CD08-0C-050-A1	<--->	5m (16.4ft.)	3	Axial	No	PUR	Figure 3
CD08-0A-050-C1	<--->	5m (16.4ft.)	3	Right-angle	No	PVC	Figure 5
CD08-0C-050-C1	<--->	5m (16.4ft.)	3	Right-angle	No	PUR	Figure 5
CD08-0A-070-A1	<--->	7m (23ft.)	3	Axial	No	PVC	Figure 1
CD08-0A-070-C1	<--->	7m (23ft.)	3	Right-angle	No	PVC	Figure 2

M12 Quick-Disconnect Cables (Euro, Micro DC-Single Key)							
Part Number	**Price**	**Length**	**Poles**	**Connector**	**LED**	**Jacket**	**Dimensions**
M12 Quick-Disconnects							
CD12L-0B-020-A0	<--->	2m (6.5ft)	4	Axial	No	PVC	Figure 6
CD12L-0B-020-C0	<--->	2m (6.5ft)	4	Right-angle	No	PVC	Figure 7
CD12M-0B-050-A1*	<--->	5m (16.4ft)	3	Axial	No	PVC	Figure 8
CD12M-0D-050-A1*	<--->	5m (16.4ft)	3	Axial	No	PUR	Figure 9
CD12M-0B-050-C1*	<--->	5m (16.4ft)	3	Right-angle	No	PVC	Figure 10
CD12M-0D-050-C1*	<--->	5m (16.4ft)	3	Right-angle	No	PUR	Figure 11
CD12M-0B-070-A1	<--->	7m (23ft)	4	Axial	No	PVC	Figure 6
CD12M-0B-070-C1	<--->	7m (23ft)	4	Right-angle	No	PVC	Figure 7
**** Note: Do not use with sensors that require 4-pole cables.***							

Cables with LED and quick-disconnect plugs

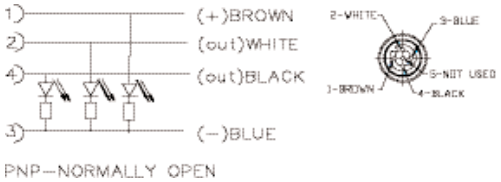
- Industry standard M12 right angle female plug with open leads
- These cables can be used with patch cables
- 2m, 5m and 10m cable lengths
- PUR (polyurethane) jacket for oily and direct sunlight applications
- IP67 /IP68 / IP69K, II rated
- LED indication for 10 -36 VDC PNP sensors only



M12 Quick-Disconnect Cables with LED Indicator (Euro, Micro DC-Single Key)							
Part Number	**Price**	**Length**	**Poles**	**Connector**	**LED**	**Jacket**	**Dimensions**
M12 Quick-Disconnects							
EVC178*	<--->	2m (6.5ft)	4	Right-angle	Yes	PUR	Figure 12
EVC179*	<--->	5m (16.4ft)	4	Right-angle	Yes	PUR	Figure 12
EVC180*	<--->	10m (32.8ft)	4	Right-angle	Yes	PUR	Figure 12

***Note: LED for 10 to 36 VDC PNP only.**
Do not use with NPN or analog ouput devices.
Do not use when white wire (Pin 2) is used for selection of a sensor function.
Do not use when emitter has check function.

LED Models' Wiring



Sensor Cables and Connectors

Cable Specifications					
Specification	**M8**		**M12**		**M12 with LED**
Length	2m (6.5ft) / 7m (23ft)	5m (16.4ft)	2m (6.5ft) / 7m (23ft)	5m (16.4ft)	2m (6.5 ft) / 5m (16.4ft) / 10m (32.8ft)
Nominal Voltage	50VAC/75VDC	60VAC/DC	300VAC	250VAC/DC	10 to 36VDC
Max Current	4A		4A		4A
LED Current Loading	N/A	N/A	N/A	N/A	**10V input** Brown wire LED: 1.7mA White and/or Black LED: 0.9mA **36V input** Brown wire LED: 7.3mA White and/or Black LED: 4.7mA
Protection Degree	IP67	IP65 / IP68 / IP69K	IP67	PVC: IP68 PUR: IP68 / IP69K	IP67 / IP68 / IP69K
Material Nut	brass; nickel plated		brass; nickel plated		brass; nickel plated
Jacket Material	PolyVinyl Chloride, (PVC)	PVC:CD08-0A-xxx. PUR:CD08-0C-xxx	PVC	PVC:CD12M-0B-xxx. PUR:CD12M-0D-xxx	PolyURethane (PUR)
Housing Material	Polyurethane (PUR)		Polyurethane (PUR)		Polyurethane (PUR)
Contacts Material	Copper-Tin Alloy (CuSn) -gold plated		Copper-Tin Alloy (CuSn) -gold plated		Gold plated brass
Tightening Torque	0.5 Nm	≤ 0.4 Nm	0.5 Nm	≤ 0.4 Nm	0.6 to 1.5 Nm
Conductors Cross Section (AWG)	0.25mm^2 (24 AWG)	0.25mm^2 (24 AWG)	0.25mm^2 (24 AWG)	0.34mm^2 (22 AWG)	4 x 0.34mm^2 (4 x 22 AWG)
Ø Outer Cable	5mm	PVC: 4 mm PUR: 4 mm	5mm	PVC: 4.2 mm PUR: 4.3 mm	5mm
Temperature Range	-25° to +80°C (-13° to 176°F)	-25° to 90°C (-13° to 194°F)	-25° to +80°C (-13° to 176°F)	PVC: -30° to 70°C (-22° to 158°F) PUR: -50° to 90°C (-58° to 194°F)	-25° to +90°C (-13° to 194°F)
Environmental	N/A	Halogen free, Silicone free	N/A	Halogen free, Silicone free	Halogen free, Silicone free
Function Display Power LED	N/A	N/A	N/A	N/A	Green
Switching Status LED	N/A	N/A	N/A	N/A	2 x Yellow
Drag Chain (Roller Cable Tray) Suitability – **Bending Radius**	min. 10 x cable diameter				
Bending Cycles	N/A	N/A	N/A	N/A	>5 million
Travel Speed	N/A	N/A	N/A	N/A	Max. 3.3 m/s for a horizontal travel length of 5 meters and max. acceleration of 5 m/s^2
Torsional Strain	N/A	N/A	N/A	N/A	±180°/m
Agency Approvals	RoHS				UL File E191684, RoHS

UL Reference	
Part Number	**Mini-Series Female Cord Connectors Series M12, UL Catalog Number**
EVC178	ADOAH043MSS0002H04
EVC179	ADOAH043MSS0005H04
EVC180	ADOAH043MSS0010H04
Note: Shown in UL file under Mini-series Female Cord Connectors using catalog number	

Dimensions

mm [inches]

Figure 1

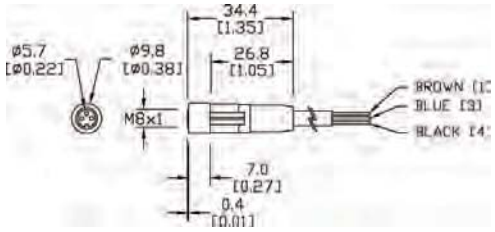
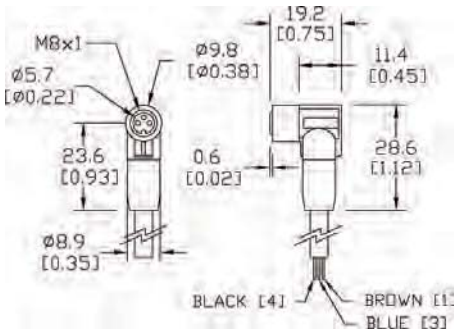


Figure 2



Sensor Cables and Connectors

Dimensions

mm [inches]

Figure 3

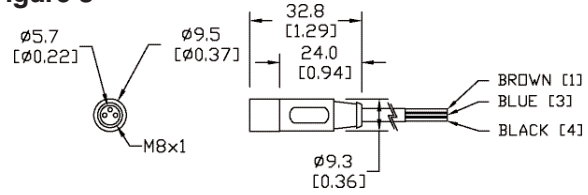


Figure 4

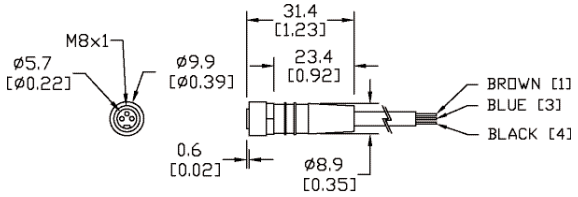


Figure 5

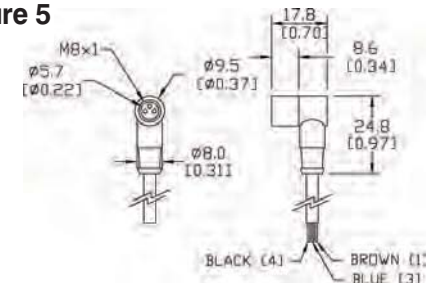


Figure 6

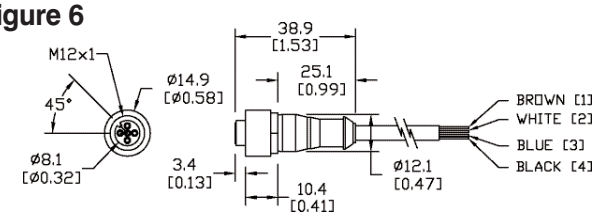


Figure 7

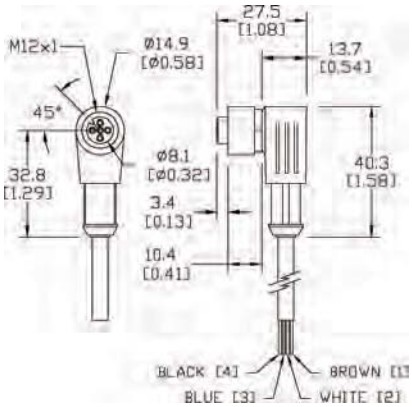


Figure 8

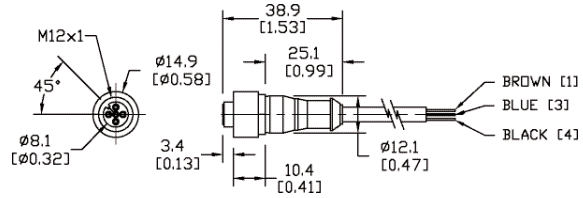


Figure 9

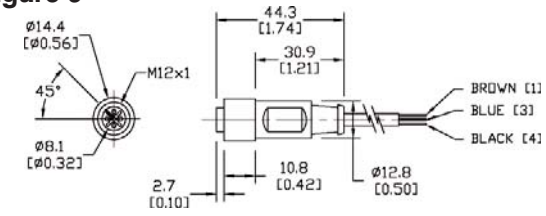


Figure 10

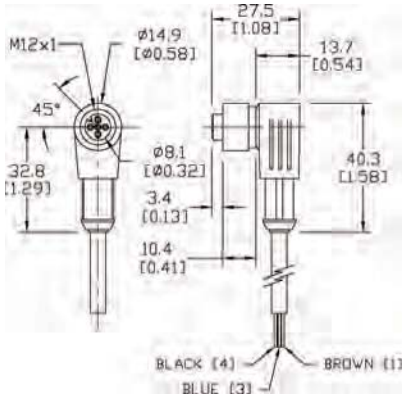


Figure 11

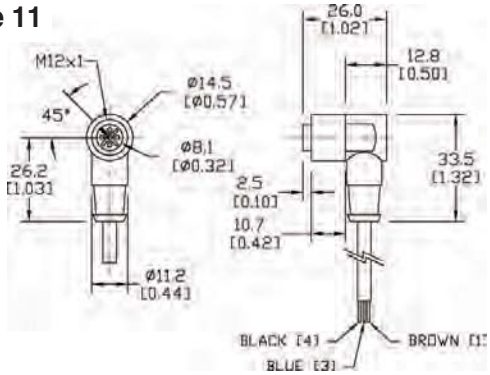
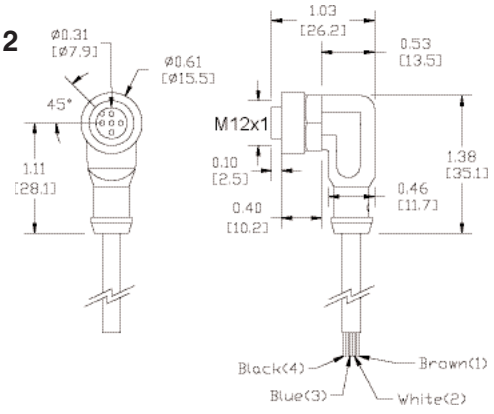


Figure 12



Sensor Cables and Connectors

Patch cables with quick-disconnect plugs on each end

Available patch cables include:

- Industry standard M8 and M12 screw-lock connectors
- One male and one female connector
- Axial and right-angle connector models
- 1m and 3m cable lengths
- PVC (polyvinyl chloride)jacket for typical industrial applications
- IP67 rated



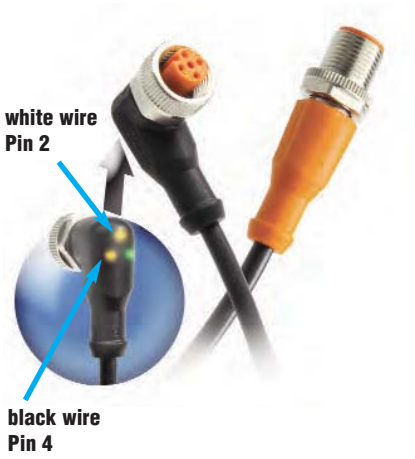
M8 Patch Cables with Quick-Disconnect on Each End (Pico, Nano)						
Part Number	**Price**	**Length**	**Poles**	**Connectors**	**Jacket**	**Dimensions**
M8 Quick-Disconnect Patch Cables						
CDP08-0A-010-AA	<--->	1m (3.28ft)	3	2 Axial. One male and one female connector	PVC	Figure 1
CDP08-0A-010-BB	<--->	1m (3.28ft)	3	2 Right-angle. One male and one female connector	PVC	Figure 3
CDP08-0A-030-AA	<--->	3m (9.84ft)	3	2 Axial. One male and one female connector	PVC	Figure 2
CDP08-0A-030-BB	<--->	3m (9.84ft)	3	2 Right-angle. One male and one female connector	PVC	Figure 3

M12 Patch Cables with Quick-Disconnect on Each End (Euro, Micro DC-Single Key)						
Part Number	**Price**	**Length**	**Poles**	**Connectors**	**Jacket**	**Dimensions**
M12 Quick-disconnect Patch Cables						
CDP12-0B-010-AA	<--->	1m (3.28ft.)	4	2 Axial. One male and one female connector	PVC	Figure 4
CDP12-0B-010-BB	<--->	1m (3.28ft.)	4	2 Right-angle. One male and one female connector	PVC	Figure 5
CDP12-0B-030-AA	<--->	3m (9.84ft.)	4	2 Axial. One male and one female connector	PVC	Figure 4
CDP12-0B-030-BB	<--->	3m (9.84ft.)	4	2 Right-angle. One male and one female connector	PVC	Figure 5

Patch Cables with LED

Available patch cables with LED include:

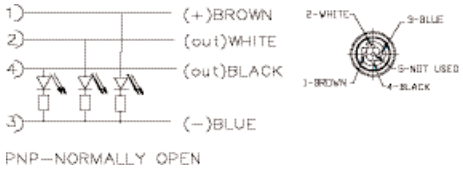
- Right-angle M12 female plug with LED indication on one end and axial male plug on the other end
- 0.3m, 0.6m, 1m, 2m, 5m, and 10m cable lengths
- PUR (polyurethane) jacket for oily and direct sunlight applications
- IP67 /IP68 / IP69K, II rated
- LED indication for 10 -36 VDC PNP sensors only



M12 Patch Cables with LED Indicator (Euro, Micro DC-Single Key)							
Part Number	**Price**	**Length**	**Poles**	**Connectors**	**LED**	**Jacket**	**Dimensions**
M12 Patch Cables							
EVC322*	<--->	0.3m (0.98ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC323*	<--->	0.6m (1.97ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC324*	<--->	1m (3.28ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC325*	<--->	2m (6.5ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC326*	<--->	5m (16.4ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC327*	<--->	10m (32.8ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6

Note: LED for 10 to 36 VDC PNP only.
Do not use with NPN or analog ouput devices.s
Do not use when white wire (Pin 2) is used for selection of a sensor function.
Do not use when emitter has check function.

LED Models' Wiring



Sensor Cables and Connectors

Cable Specifications			
Specification	**M8**	**M12**	**M12 with LED**
Length	1m (3.28ft.) / 3m (9.84ft.)		0.3m (0.98ft) / 0.6m (1.97ft) / 1m (3.28ft) 2m (6.5ft) / 5m (16.4ft) / 10m (32.8ft)
Nominal Voltage	60 VAC/DC	250 VAC/DC	10 to 36VDC
Max Current	4A		4A
LED Current Consumption	N/A		**10V input** Brown wire LED: 1.7mA White and/or Black LED: 0.9mA **36V input** Brown wire LED: 7.3mA White and/or Black LED: 4.7mA
Protection Degree	IEC IP67		IEC IP67/IP68/IP69K
Material Nut	Brass: nickel plated		Brass: nickel plated
Jacket Material	PolyVinyl Chloried (PVC)		PolyURethane (PUR)
Housing Material	PolyURethane (PUR)		Connector: Orange PUR, Socket: Black PUR
Contacts Material	Copper-tin(CuSn)=Brass		Brass; gold plated
Conductors Cross Section (AWG)	0.34mm^2		0.34mm^2 (22 AWG)
Tightening Torque	0.5 Nm		**Plug:** 0.6 to 1.5 Nm (take into account the maximum value of the counterpart) **Socket:** 0.6 to 1.5 Nm
Ø Outer Cable	5mm		5mm
Temperature Range	-25° to +70°C (-13° to 158°F)		-25° to +90°C (-13° to 194°F)
Function Display LED	N/A		Green
Switching Status LED	N/A		2 x Yellow
Drag Chain (Roller Cable Tray) Suitability – **Bending Radius**	min. 10 x cable diameter		
Drag Chain (Roller Cable Tray) Suitability – **Bending Cycles**	>5 million		
Drag Chain (Roller Cable Tray) Suitability – **Travel Speed**	N/A		Max. 3.3 m/s for a horizontal travel length of 5 m and max. acceleration of 5 m/s^2
Drag Chain (Roller Cable Tray) Suitability – **Torsional Strain**	N/A		±180°/m
Agency Approvals	RoHS		UL File E191684, RoHS

UL Reference	
Part Number	**Cable Assemblies Series M12, UL Catalog Number**
EVC322	VDOAH043MSS00.3H04STGH040MSS
EVC323	VDOAH043MSS00.6H04STGH040MSS
EVC324	VDOAH043MSS0001H04STGH040MSS
EVC325	VDOAH043MSS0002H04STGH040MSS
EVC326	VDOAH043MSS0005H04STGH040MSS
EVC327	VDOAH043MSS0010H04STGH040MSS
Note: Shown in UL file under Cable Assemblies using catalog number	

Sensor Cables and Connectors

Dimensions mm [inches]

Figure 1

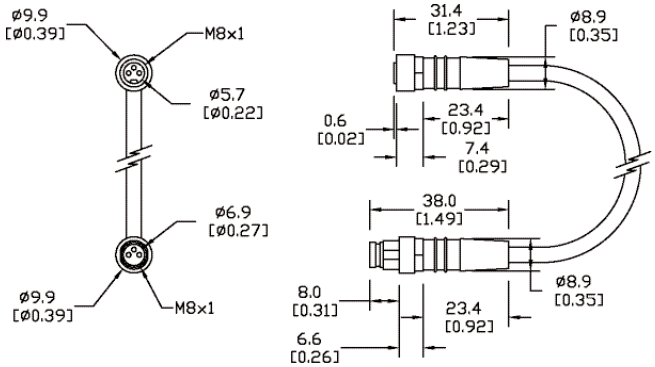


Figure 2

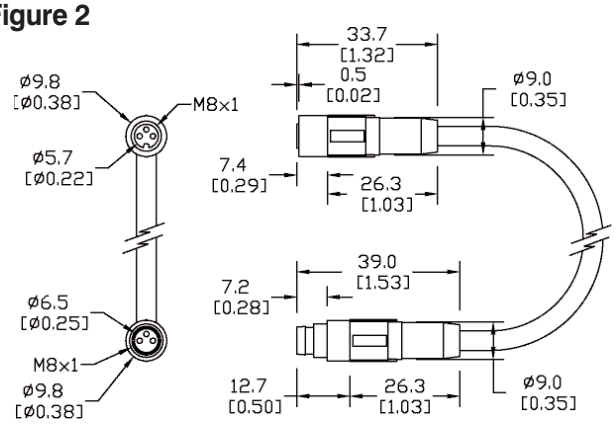


Figure 3

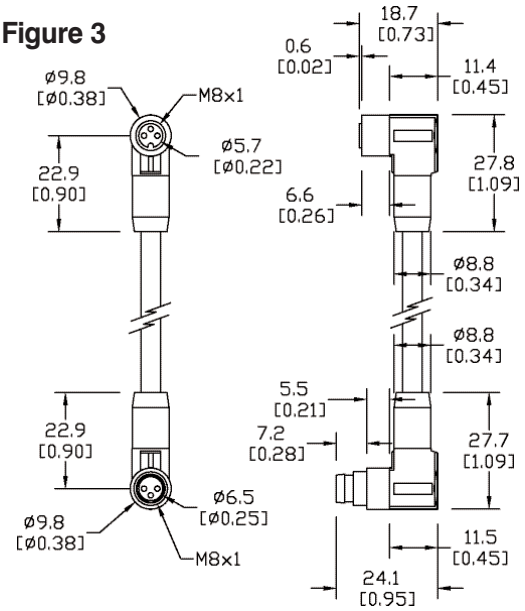


Figure 4

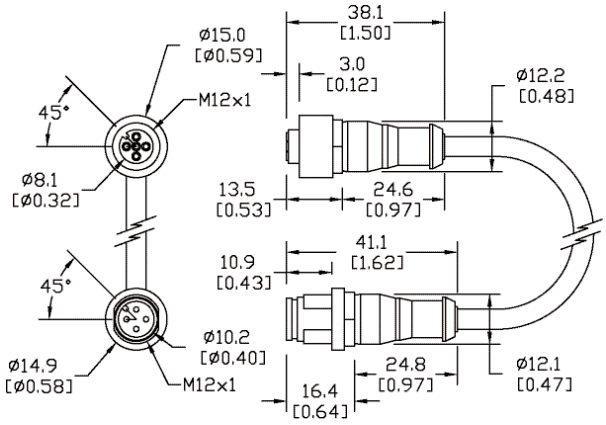


Figure 5

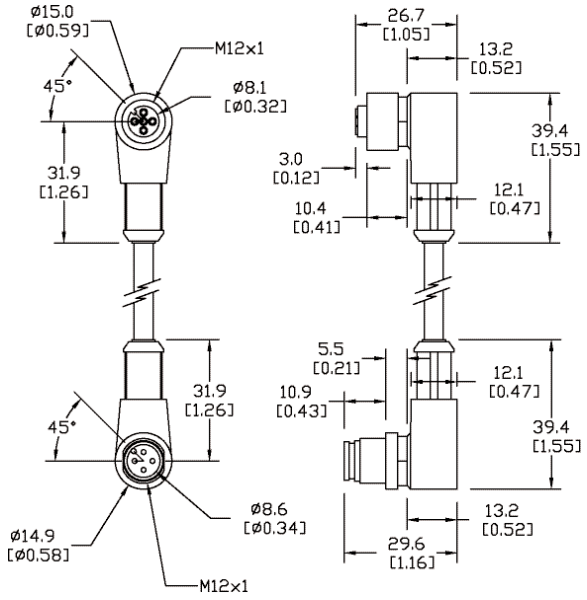
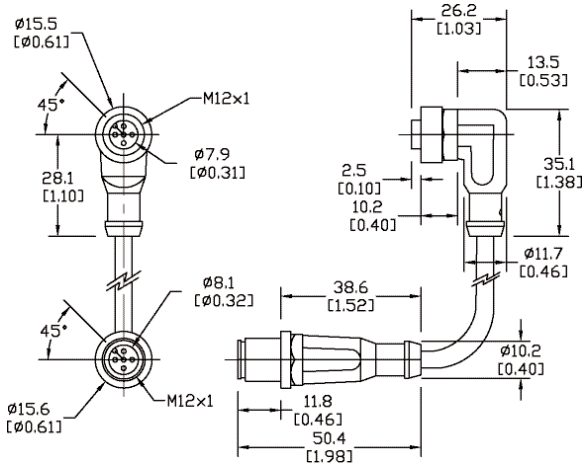


Figure 6



ProSense® Compression Mounting Fittings for Temperature Probes

Compression Mounting Fittings for Temperature Probes				
Part Number	**Description**	**Pcs/ Pkg**	**Wt(lb)**	**Price**
BCF18-125N	Compression fitting, brass, for 1/8 inch diameter temperature probes,1/8 inch NPT male thread	1	0.5	<--->
BCF14-125N	Compression fitting, brass, for 1/4 inch diameter temperature probes,1/8 inch NPT male thread	1	0.5	<--->
BCF18-25N	Compression fitting, brass, for 1/8 inch diameter temperature probes,1/4 inch NPT male thread	1	0.5	<--->
BCF14-25N	Compression fitting, brass, for 1/4 inch diameter temperature probes,1/4 inch NPT male thread	1	0.5	<--->
BCF18-50N	Compression fitting, brass, for 1/8 inch diameter temperature probes,1/2 inch NPT male thread	1	0.5	<--->
BCF14-50N	Compression fitting, brass, for 1/4 inch diameter temperature probes,1/2 inch NPT male thread	1	0.5	<--->
CF18-125N	Compression fitting, 316 stainless steel, for 1/8 inch diameter temperature probes,1/8 inch NPT male thread	1	0.5	<--->
CF14-125N	Compression fitting, 316 stainless steel, for 1/4 inch diameter temperature probes,1/8 inch NPT male thread	1	0.5	<--->
CF18-25N	Compression fitting, 316 stainless steel, for 1/8 inch diameter temperature probes,1/4 inch NPT male thread	1	0.5	<--->
CF14-25N	Compression fitting, 316 stainless steel, for 1/4 inch diameter temperature probes,1/4 inch NPT male thread	1	0.5	<--->
CF18-50N	Compression fitting, 316 stainless steel, for 1/8 inch diameter temperature probes,1/2 inch NPT male thread	1	0.5	<--->
CF14-50N	Compression fitting, 316 stainless steel, for 1/4 inch diameter temperature probes,1/2 inch NPT male thread	1	0.5	<--->
CFTF-18	Teflon™ ferrule for brass or stainless steel compression fittings and 1/8 diameter temperature probes	5	0.5	<--->
CFTF-14	Teflon ferrule for brass or stainless steel compression fittings and 1/4 diameter temperature probes	5	0.5	<--->
CF06-25N	1/4 NPT stainless steel compression fitting for 0.24 inch (6 mm) diameter RTD probe with M12 connector.	1	0.18	<--->
CF10-50N	1/2 NPT stainless steel compression fitting for 10 mm (0.4 inch) diameter RTD probe with M12 connector.	1	0.20	<--->
CF18-BC	Bayonet compression fitting, for 1/8" diameter probe sheath sensors	1	0.1	<--->
BB125N-50N	Reducing bushing, brass, 1/2 MNPT x 1/8 FNPT, hex head	1	0.1	<--->

NOTE: CHECK THE CHEMICAL COMPATIBILITY OF THE SENSOR'S WETTED PARTS WITH THE MEDIUM TO BE MEASURED.

***Working pressure of compression fitting should not exceed 500 psi. However we recommend any pressure application use a thermowell**

BCF18-125N



BCF18-25N



BCF18-50N



BB125N-50N



CFTF-14



CFTF-18



CF14-125N



CF14-50N



CF14-25N



CF18-BC



CF06-25N



CF10-50N



ProSense® Compression Mounting Fittings for Temperature Probes

BCF14-125N



BCF14-25N



BCF14-50N



CF18-25N



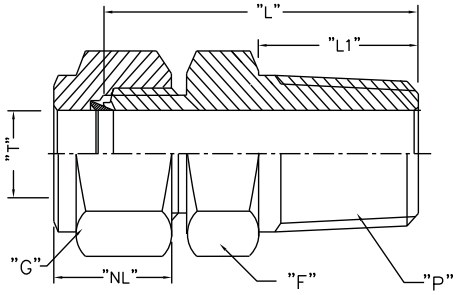
CF18-50N



CF18-125N



Dimensions



Note: All threaded connections should be hand tightened and then turned 1 to 2 full turns for proper sealing.

Actual torque required for a proper seal of NPT threads is influenced by tolerance, sealant, lubricant, etc.

ProSense Compression Fittings									
Part No.	**Weight (lb)**	**Description**	**"T" Tube O.D.**	**"P" NPT(M)**	**"L" Body Length***	**"L1" Thread Length****	**"F" Body Hex****	**"G" Nut Hex****	**"NL" Nut Length****
BCF18-125N/ CF18-125N	0.5	1/8" OD x 1/8" NPT(M)	0.128/0.132	1/8" NPT(M)	0.909"	0.393"	0.5"	0.433"	0.492"
BCF14-125N/ CF14-125N	0.5	1/4" OD x 1/8" NPT(M)	0.253/0.257	1/8"NPT(M)	1.0"	0.393"	0.5"	0.559"	0.5"
BCF18-25N/ CF18-25N	0.5	1/8" OD x 1/4" NPT(M)	0.128/0.132	1/4" NPT(M)	1.114"	0.551"	0.551"	0.433"	0.492"
BCF14-25N/ CF14-25N	0.5	1/4" OD x 1/4" NPT(M)	0.253/0.257	1/4" NPT(M)	1.188"	0.551"	0.551"	0.559"	0.5"
BCF18-50N/ CF18-50N	0.5	1/8" OD x 1/2" NPT(M)	0.128/0.132	1/2" NPT(M)	1.377"	0.748"	0.866"	0.433"	0.492"
BCF14-50N/ CF14-50N	0.5	1/4" OD x 1/2" NTP(M)	0.253/0.257	1/2" NPT(M)	1.437"	0.748"	0.866"	0.559"	0.5"
CF06-25N	0.18	6 mm OD x 1/4" NPT(M)	0.236/0.240	1/4" NPT(M)	1.174"	0.59"	0.67"	0.55"	0.587"
CF10-50N	0.20	10 mm OD x 1/2" NPT(M)	0.394/0.399	1/2" NPT(M)	1.458"	0.55"	1.06"	0.75"	0.608"

Note: All dimensions are in inches
*** ± 0.07***
**** ± 0.03***

Note: Once the compression fitting has been fully tightened on the probe, the ferrule will be locked onto the probe and cannot be removed or reused.

****Working pressure of compression fitting should not exceed 500 psi. However we recommend any pressure application use a thermowell***

ProSense® Bayonet Mounting Adapter for Temperature Sensors

Bayonet Mounting Adapter for Temperature Sensors				
Part Number	**Description**	**Pcs/ Pkg**	**Wt(lb)**	**Price**
BA-078	Bayonet adapter, 7/8 inch long, 7/16 inch outside diameter, 9/32 inch inside diameter, 1/8 inch MNPT	1	0.5	<--->
BA-100	Bayonet adapter, 1 inch long, 7/16 inch outside diameter, 9/32 inch inside diameter, 1/8 inch MNPT	1	0.5	<--->
BA-114	Bayonet adapter, 1-1/4 inch long, 7/16 inch outside diameter, 9/32 inch inside diameter, 1/8 inch MNPT	1	0.5	<--->
BA-112	Bayonet adapter, 1-1/2 inch long, 7/16 inch outside diameter, 9/32 inch inside diameter,1/8 inch MNPT	1	0.5	<--->
BA-200	Bayonet adapter, 2 inch long, 7/16 inch outside diameter, 9/32 inch inside diameter, 1/8 inch MNPT	1	0.5	<--->
BA-212	Bayonet adapter, 2-1/2 long, 7/16 inch outside diameter, 9/32 inch inside diameter, 1/8 inch MNPT	1	0.5	<--->
BA-300	Bayonet adapter, 3 inch long, 7/16 inch outside diameter, 9/32 inch inside diameter, 1/8 inch MNPT	1	0.5	<--->
BA-312	Bayonet adapter, 3-1/2 long, 7/16 inch outside diameter, 9/32 inch inside diameter, 1/8 inch MNPT	1	0.5	<--->
CF18-BC	Adjustable bayonet compression fitting, for 1/8" diameter probe sheath sensors	1	0.1	<--->
BB125N-50N	Reducing bushing, brass, 1/2 MNPT x 1/8 FNPT, hex head	1	0.1	<--->

NOTE: CHECK THE CHEMICAL COMPATIBILITY OF THE SENSOR'S WETTED PARTS WITH THE MEDIUM TO BE MEASURED.

BA-078



BA-100



BA-114



CF18-BC



BA-300



BA-112



BB125N-50N



BA-312



BA-200



BA-212



ProSense® Thermocouple and RTD Temperature Range

Thermocouple Temperature Range	
THMK-C06-04	32 to 2100°F (0 to 1149°C)
THMK-C12-04	
THMK-C18-04	
THMK-H06L01-03	
THMK-H12L01-03	
THMK-H18L01-03	
THMK-T06L06-03	32 to 2100°F (0 to 1149°C) lead wire transition rated to 204°C (400°F)
THMK-T12L06-03	
THMK-T18L06-03	
TTD25C-20-0300F-H	0 to 300°F (-17.8 to 148.9°C)
TTD25N-20-0300F-H	
THMJ-A01L04-01	32 to 900°F (0 to 482°C)
THMJ-A01L06-01	
THMJ-A01L10-01	
THMJ-A01L10-02	
THMJ-B01L06-01	
THMJ-B01L06-02	
THMJ-B02L06-01	
THMJ-B02L06-02	
THMJ-D08L04-01	
THMJ-D08L06-01	
THMJ-D08L10-01	
THMJ-D08L10-02	
THMK-A01L04-01	
THMK-A01L06-01	
THMK-A01L10-01	
THMK-A01L10-02	
THMK-B01L06-01	
THMK-B01L06-02	
THMK-D08L04-01	
THMK-D08L06-01	
THMK-D08L10-01	
THMK-D08L10-02	
THMJ-T06L06-01	32 to 970°F (0 to 521°C), lead wire transition rated to 400 °F (204 °C)
THMJ-T12L06-01	
THMJ-T18L06-01	
THMJ-P06-01	32 to 970°F (0 to 521°C), plug rated to 400 °F (204 °C)
THMJ-P12-01	
THMJ-P18-01	
THMJ-C04-03	32 to 1330°F (0 to 720°C)
THMJ-C04R-03	
THMJ-C06-01	
THMJ-C06-02	
THMJ-C06-03	
THMJ-C06R-03	
THMJ-C12-01	
THMJ-C12-02	
THMJ-C12-03	
THMJ-C12R-03	
THMJ-C18-01	
THMJ-C18-02	
THMJ-H04L01-02	
THMJ-H06L01-01	
THMJ-H06L01-02	
THMJ-H12L01-01	
THMJ-H12L01-02	
THMJ-H18L01-01	

Thermocouple Temperature Range	
THMJ-T06L06-02	32 to 1330°F (0 to 720°C) lead wire transition rated to 400 °F (204 °C)
THMJ-T12L06-02	
THMJ-T18L06-02	
THMJ-P06-02	32 to 1330°F (0 to 720°C) plug rated to 400 °F (204 °C)
THMJ-P12-02	
THMJ-P18-02	
THMK-C04-03	32 to 1700°F (0 to 927°C)
THMK-C04R-03	
THMK-C06-01	
THMK-C06-02	
THMK-C06-03	
THMK-C06R-03	
THMK-C12-01	
THMK-C12-02	
THMK-C12-03	
THMK-C12R-03	
THMK-C18-01	
THMK-C18-02	
THMK-H04L01-02	
THMK-H06L01-01	
THMK-H06L01-02	
THMK-H12L01-01	
THMK-H12L01-02	
THMK-H18L01-01	
THMK-T06L06-01	32 to 1700°F (0 to 927°C) lead wire transition rated to 400 °F (204 °C)
THMK-T06L06-02	
THMK-T12L06-01	
THMK-T12L06-02	
THMK-T18L06-01	
THMK-T18L06-02	
THMK-P06-01	32 to 1700°F (0 to 927°C) plug rated to 400 °F (204 °C)
THMK-P06-02	
THMK-P12-01	
THMK-P12-02	
THMK-P18-01	
THMK-P18-02	
THMK-B02L06-01	32° to 900°F (0° to 482°C)
THMK-B02L06-02	
THMT-P06-01	-328 to 700°F (-200 to 371°C) plug rated to 400 °F (204 °C)
THMT-P12-01	
THMT-P18-01	
THMT-T06L06-01	-328 to 700°F (-200 to 371°C), lead wire transition rated to 400 °F (204 °C)
THMT-T12L06-01	
THMT-T18L06-01	
TTD25C-20-0100C-H	32 to 212°F (0 to 100°C)
TTD25N-20-0100C-H	
TSD25N-0P-0284-H	-4 to 284°F (-20 to 140°C)
TSD25N-AP-0284-H	

RTD Temperature Range	
RTD1-R01-01	40 to 185°F (-40 to 85°C)
RTD1-S04-01	-58 to 572°F (-50 to 300°C)
RTD1-S04-02	
RTD1-S04-03	
RTD1-S04-04	
RTD1-B01L06-01	
RTD1-B02L06-01	
RTD1-C04-03	
RTD1-C04R-03	
RTD1-C06-01	
RTD1-C06-03	
RTD1-C06R-03	
RTD1-C12-01	
RTD1-C12-02	
RTD1-C12-03	
RTD1-C12R-03	
RTD1-C18-01	
RTD1-C18-02	
RTD1-H04L01-02	
RTD1-H06L01-01	
RTD1-H06L01-02	
RTD1-H12L01-01	
RTD1-H12L01-02	
RTD1-H18L01-01	
RTD1-P06-01	-58 to 572°F (-50 to 300°C) Plug rated to 400°F (204°C)
RTD1-P12-01	
RTD1-P18-01	
RTD1-D08L10-01	-58 to 572°F (-50 to 300°C), lead wire transition rated to 400°F (204°C)
RTD1-T06L06-01	
RTD1-T12L06-01	
RTD1-T18L06-01	

J, K, & T Thermocouple Color Code		
J	White	+
	Red	-
K	Yellow	+
	Red	-
T	Blue	+
	Red	-

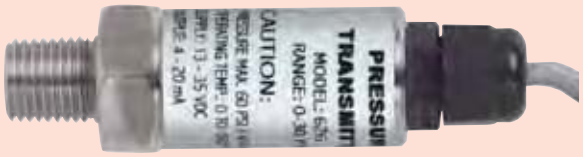
Series 626 & 628

Industrial Pressure Transmitter

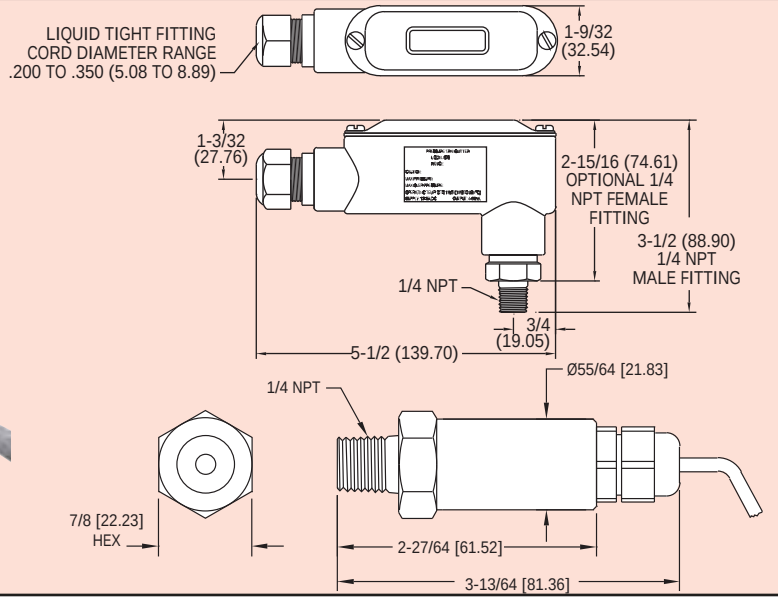
Complete Offering of Ranges, Connections and Outputs



Conduit Housing (-CH)



General Purpose Housing (-GH)



The Series 626 Pressure Transmitters possess a highly precise 0.25% piezo-resistive sensor contained in a compact, rugged, NEMA 4X stainless steel general purpose housing or cast aluminum conduit housing.

The Series 628 Pressure Transmitters are ideal for OEMs with 1% full scale accuracy sensors. The transmitter is also available in the general purpose stainless steel housing and the cast aluminum conduit housing.
The highly corrosive resistant 316L stainless steel wetted parts allow the Series 626 and 628 transmitters to measure the pressure in a multitude of processes from hydraulic oils to chemicals. The Series 626 and 628 are available in ranges of vacuum, compound to 5000 psi with a variety of optional outputs, process connections and electrical terminations to allow you to select the right transmitter for your application.

APPLICATIONS

- Compressors
- Pumping Systems
- Irrigation Equipment
- Hydraulic
- Industrial Process Monitoring

SPECIFICATIONS

Service: Compatible gases and liquids.
Wetted Materials: Type 316L SS; Ceramic Ranges: Type 316 SS, ceramic, fluoroelastomer.
Accuracy: 626: 0.25% full scale;
626 ceramic ranges: 0.5% full scale;
628: 1% full scale.
(Includes linearity, hysteresis, and repeatability.)
Temperature Limit: 0 to 200°F (-18 to 93°C).
Compensated Temperature Range: 0 to 175°F (-18 to 79°C).
Thermal Effect: 626: ±0.02% FS/°F. 628: ±0.04% FS/°F (includes zero and span).
Pressure Limits: See table.
Power Requirements: 13 to 30 VDC.
Output Signal: 4 to 20 mA. Optional 0-5, 1-5, 0-10, 1-6 or 2-10.
Response Time: 50 msec.
Loop Resistance: 0 - 1300 ohms maximum for current.
For voltage outputs, minimum load resistance: 2000 ohms.
Current Consumption: 38 mA (maximum).
Electrical Connections: Conduit Housing (-CH): terminal block, 1/2″ female NPT conduit. General Purpose Housing (-GH): cable or DIN connector.
Process Connection: 1/4″ male or female NPT and BSPT.
Enclosure Rating: NEMA 4X (IP66).
Mounting Orientation: Mount in any position.
Weight: 10 oz (283 g).
Agency Approvals: CE.

Pressure Limits

Range Number	Pressure Range (psig)	Maximum Pressure (psig)	Over Pressure (psig)	Range Number	Pressure Range (psig)	Maximum Pressure (psig)	Over Pressure (psig)
00	30″ Hg-0	30	45	11	0-150	300	750
30	0-30″ Hg	30	45	12	0-200	400	1000
01	30″ Hg-0-15	60	90	13	0-300	600	1500
02	30″ Hg-0-30	90	130	14	0-500	1000	2500
03	30″ Hg-0-45	120	180	15	0-1000	2000	5000
04	30″ Hg-0-60	150	225	16	0-1500	3000	5000
05	30″ Hg-0-100	200	300	17	0-2000	4000	5000
06	0-5	10	50	18	0-3000	6000	7500
07	0-15	30	150	19	0-5000	7500	10000
08	0-30	60	300	26	0-8000	10000	12000
09	0-50	100	300				
10	0-100	200	500				

Ordering Chart

Accuracy	626 628							0.25% Full Scale Accuracy 1.0% Full Scale Accuracy
Range		-30 -00 -01 -02 -03 -04 -05 -06 -07 -08 -09 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -26						0-30″ Hg Vacuum* 30″ Hg Vacuum - 0 psi* 30-0-15 psi* 30-0-30 psi* 30-0-45 psi* 30-0-60 psi* 30-0-100 psi* 0-5 psi 0-15 psi 0-30 psi 0-50 psi 0-100 psi 0-150 psi 0-200 psi 0-300 psi 0-500 psi 0-1000 psi 0-1500 psi 0-2000 psi 0-3000 psi 0-5000 psi 0-8000 psi
Housing			-CH -GH					Conduit Housing General Purpose Housing
Process Connection				-P1 -P2 -P3 -P4 -P5 -P8 -P9				1/4″ male NPT 1/4″ female NPT 1/4″ male BSPT 1/4″ female BSPT 1/4″ female SAE with Refrigerant Valve Depressor† 1/8″ male NPT† 1/2″ male NPT†
Electrical Connection					-E1 -E2 -E3 -E4 -E5 -E6			Cable Gland with 3’ of Prewired Cable Cable Gland with 6’ of Prewired Cable Cable Gland with 9’ of Prewired Cable DIN Connector† 1/2″ female NPT Conduit‡ M-12 4 Pin Connector
Signal Output						-S1 -S2 -S3 -S4 -S5 -S6		4-20 mA 1-5 Volt 2-10 Volt 0-5 Volt 0-10 Volt 1-6 Volt
Options							-AT -NIST -LED	Aluminum Tag NIST Traceable Certificate Bright Red LED display‡

† Available with -GH Housing only
‡ Available with -CH Housing only
*Optional ceramic sensor available. Add “C” to the range (Ex. 626-00C-GH-P1-E1-S1).
Note: Ceramic transmitters are only available with 4-20 mA output and are not CE approved.

626 with LED Display (CH housing only)

Note: LED option is not NEMA 4X rated.



Optional -E4 DIN Connector (GH housing only)



Series 626 & 628 Pressure Transmitters

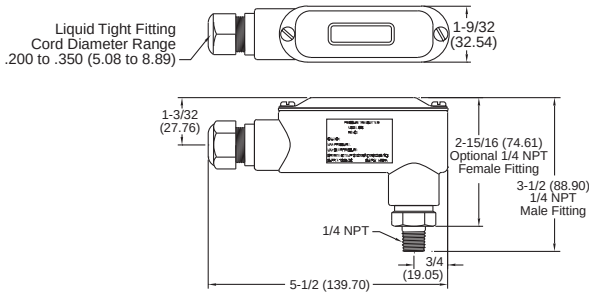
Specifications - Installation and Operating Instructions

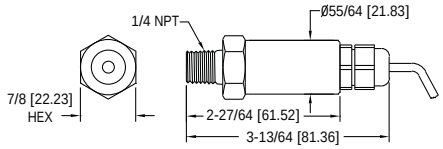


-CH Conduit Housing



-GH General Purpose Housing





The Series 626 and 628 Pressure Transmitters converts a single positive pressure into a standard 4-20 mA output signal. The Series 626 and 628 can be used to accurately measure compatible gases and liquids; Series 626 full scale accuracy is 0.25%; Series 628 full scale accuracy is 1.0% (see specifications). Designed for industrial environments with a NEMA 4X (IP66) housing, this transmitter resists most effects of shock and vibration.

CAUTION: Do not exceed specified supply voltage ratings. Permanent damage not covered by warranty will result. This device is not designed for 120 or 240 volt AC operation. Use only on 13 to 30 VDC.

Pressure Ranges		
Pressure Range (psig)	**Maximum Pressure (psig)**	**Over Pressure (psig)**
30″ Hg-0	30	45
30-0-15	60	90
30-0-30	90	130
30-0-45	120	180
30-0-60	150	225
30-0-100	200	300
0-5	10	50
0-15	30	150
0-30	60	300
0-50	100	300
0-100	200	500
0-150	300	750
0-200	400	1000
0-300	600	1500
0-500	1000	2500
0-1000	2000	5000
0-1500	3000	5000
0-2000	4000	5000
0-3000	6000	7500
0-5000	7500	10000
0-8000	10000	12000
0-30″ Hg (vacuum)	30	150

SPECIFICATIONS

Service: Compatible gases and liquids.
Wetted Materials: Type 316L SS; Ceramic Ranges: Type 316 SS, ceramic, fluoroelastomer.
Accuracy: 626: 0.25% full scale;
626 ceramic ranges: 0.5% full scale;
628: 1% full scale.
(Includes linearity, hysteresis, and repeatability.)
Temperature Limit: 0 to 200°F (-18 to 93°C).
Compensated Temperature Range: 0 to 175°F (-18 to 79°C).
Thermal Effect: 626: ±0.02% FS/°F. 628: ±0.04% FS/°F (includes zero and span).
Pressure Limits: See table.
Power Requirements: 13 to 30 VDC.
Output Signal: 4 to 20 mA. Optional 0-5, 1-5, 0-10, 1-6 or 2-10.
Response Time: 50 msec.
Loop Resistance: 0 - 1300 ohms maximum for current.
For voltage outputs, minimum load resistance: 2000 ohms.
Current Consumption: 38 mA (maximum).
Electrical Connections: Conduit Housing (-CH): terminal block, 1/2″ female NPT conduit. General Purpose Housing (-GH): cable or DIN connector.
Process Connection: 1/4″ male or female NPT and BSPT.
Enclosure Rating: NEMA 4X (IP66).
Mounting Orientation: Mount in any position.
Weight: 10 oz (283 g).
Agency Approvals: CE.
*Note: Transmitters with ceramic sensor are not CE approved.

INSTALLATION

1. Location: Select a location where the temperature of the transmitter will be between 0 and 175°F (-18 to 79°C). Distance from the receiver is limited only by total loop resistance. The tubing or piping supplying pressure to the unit can be practically any length required but long lengths will increase response time slightly.
2. Position: The transmitter is not position sensitive. However all standard models are originally calibrated with the unit in a position with the pressure connection downward. Although they can be used at other angles, for best accuracy it is recommended that units be installed in the position calibrated at the factory.
3. Pressure Connection: Use a small amount of plumber's tape or other suitable sealants to prevent leaks. Be sure the pressure passage inside the port is not blocked.
4. Electrical Connections
Wire Length - The maximum length of wire connecting the transmitter and receiver is a function of wire size and receiver resistance. Wiring should not contribute more than 10% of the receiver resistance to total loop resistance. For extremely long runs (over 1000 feet), choose receivers with higher resistance to minimize the size and cost of connecting leads. Where wiring length is under 100 feet, wire as small as 22 AWG can be used.

CURRENT (4-20 mA) OUTPUT OPERATION

An external power supply delivering 13-30 VDC with minimum current capability of 40 mA DC (per transmitter) is required to power the control loop. See Fig. A for connection of the power supply, transmitter and receiver. The range of appropriate receiver load resistance (R_L) for the DC power supply voltage available is expressed by the formula:

$$R_L \text{ Max} = \frac{Vps - 13}{20 \text{ mA DC}}$$

Shielded cable is recommended for control loop wiring.

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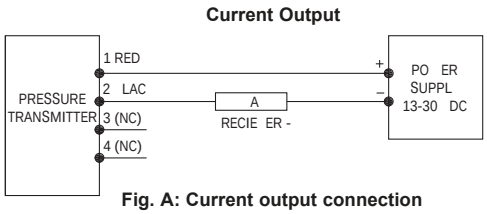


Fig. A: Current output connection

4a. Conduit Housing (-CH) Electrical connections to the pressure transmitters are made to the terminal block located inside the housing. Remove the screws and lift off the cover. Wire as shown in Fig. A, B or C. Use Fig. A for current output connection. Use Fig. B for current output with optional LED display. Use Fig. C for current output with optional LED display using two power supplies.

If ordering optional pre-wired cable, black wire is negative (-) and red wire is positive (+).

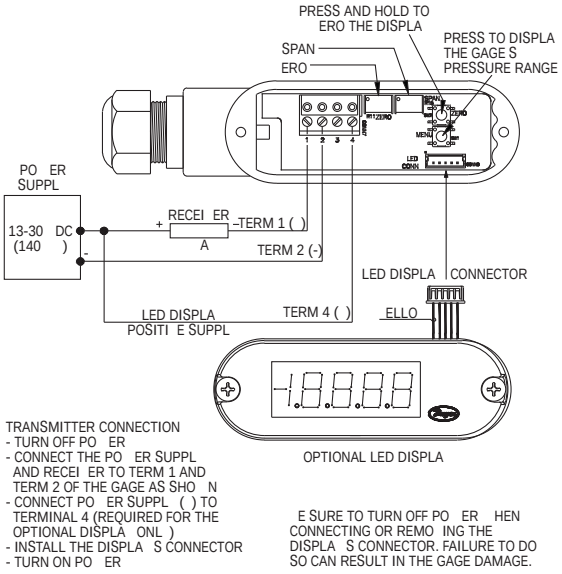


Fig. B: Current output with optional LED display connection

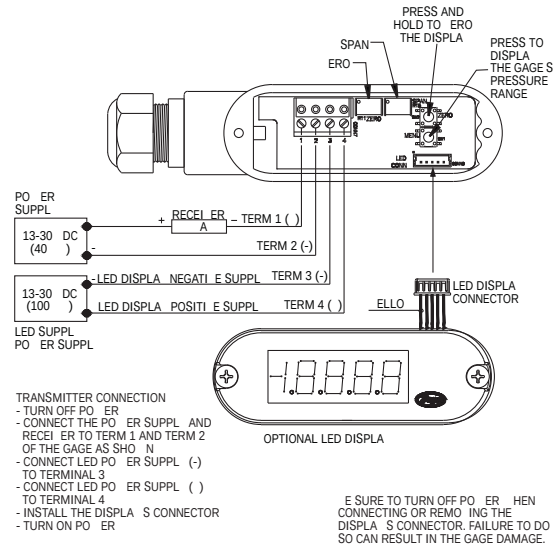


Fig. C: Current output with optional LED display using two power supplies

MAINTENANCE
After final installation of the pressure transmitter and its companion receiver, no routine maintenance is required. A periodic check of system calibration is suggested. The Series 626 and 628 transmitters are not field repairable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

4b. General Purpose Housing (-GH) When using cable version of -GH General Purpose Housing, black wire is negative (-) and red wire is positive (+). When using optional Heirschman DIN Plug, remove top-center screw and lift off the terminal block assembly. Wire to terminals shown below in Fig. D. For optional 4-pin M-12 connector, wire to pins as shown in Fig. E.

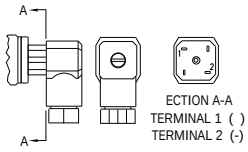


Fig. D

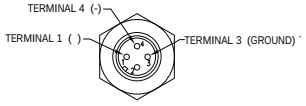


Fig. E

VOLTAGE (0-5, 1-5, 0-10, 1-6 or 2-10 Volt) OUTPUT OPERATION
(Other outputs contact the factory) See Fig. F for connection of the power supply, transmitter and receiver.

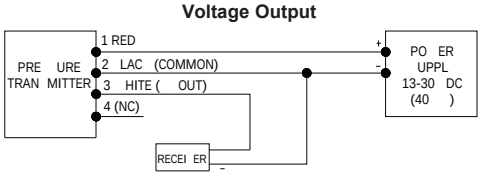


Fig. F: Voltage output connection

4c. Conduit Housing (-CH) Electrical connections to the pressure transmitters are made to the terminal block located inside the housing. Remove the screws and lift off the cover. Wire as shown in Fig. F or Fig. G. Use Fig. F for voltage output connection. Use Fig. G for voltage output with optional LED display connection. If ordering optional pre-wired cable, black wire is negative (-), red wire is positive (+) and white wire is +Vout.

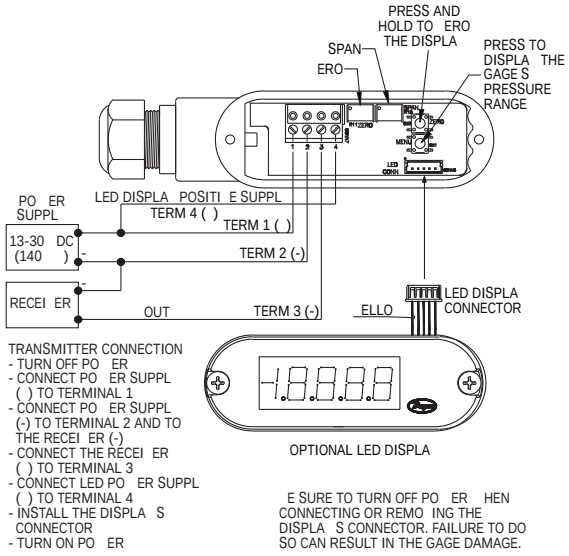


Fig. G: Voltage output with optional LED display connection

4d. General Purpose Housing (-GH) When using cable version of -GH General Purpose Housing, black wire is negative (-), red wire is positive (+) and white wire is output. When using optional Heirschman DIN Plug, remove top-center screw and lift off the terminal block assembly. Wire to terminals shown below in Fig. H. For optional 4-pin M-12 connector, wire to pins as shown in Fig. I. If utilizing optional A-164 cable for M-12 connection, brown wire corresponds to pin #1, white #2, blue #3, and black #4.

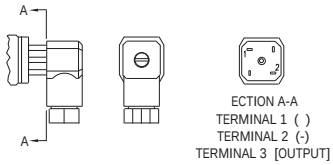


Fig. H

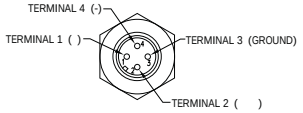


Fig. I

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CDI 5400

FLOWMETER FOR COMPRESSED-AIR SYSTEMS Rev. 2.0

- **Easy to install**
- **No moving parts**
- **Digital display**
- **Milliamp and pulse outputs**
- **No calibration or setup required**
- **Complete flowmeter in one package**
- **Optional RS-485 output for net-working**
- **Housing rotates to suit vertical or horizontal installation**



The CDI 5400 clamps onto a pipe, with two flow-sensing probes projecting into the pipe through 3/16-in. drilled holes. It seals directly to the pipe; no cutting or welding is required for installation. Because each flowmeter is made and calibrated for a specific size of pipe, the digital display indicates flow directly, with no setup or adjustment.

The meter measures flow by maintaining one probe warmer than the other. It calculates the mass velocity from the amount of heat required, and then calculates the flow on the basis of pipe area. The flow rate, in scfm, is shown on a large, four-digit display; a 4-20 mA output and a pulse output permit remote display, totalizing and data collection.

AVAILABLE SIZES			
Nom Size [a]	Calibrated range [b] (scfm)	Model No. for Sch 40 Steel	Model No. for Type L Copper
2 in.	4 - 400	5400-20S	5400-20C[c]
2.5 in.	5 - 500	5400-25S	5400-25C
3 in.	12 - 1200	5400-30S	5400-30C[c]
4 in.	20 - 2000	5400-40S	5400-40C[c]
5 in.	20 - 2500	5400-50S	--
6 in.	50 - 5000	5400-60S	--
8 in.	100 - 6000	5400-80S	--

(a) Meters are also available for several sizes of Aluminum pipe. For metering smaller pipe sizes, please see our Series 5200 flowmeters.

(b) Accuracy will be reduced when flow is outside of the specified range. Milliamp scale ranges differ.

(c) Flowmeters for 2", 3", and 4" copper have smaller calibrated ranges.

SPECIFICATIONS

Accuracy:
5 percent of reading plus one percent of full scale at air temperatures between 40 and 120 degrees Fahrenheit

Accuracy, extended range:
7 percent of reading from rated full scale to 150 percent of calibrated range, at air temperatures between 40 and 120 degrees Fahrenheit

Fluids:
Compressed air and nitrogen

Operating pressure:
200 psig maximum on Sch. 40 steel and on Type L copper below three inch; consult CDI for other materials and higher pressures.

Input power:
250 mA at 18 to 24 Vdc

Output resistance:
400 Ohms max.

Materials exposed to measured fluid:
Stainless steel, gold, thermal epoxy and Viton (seal)

Ring material:
Aluminum

Display:
Four-digit LED display

Response time:
One second to 63 percent of final value

US Patent 6,802,21

APPLICATION

The meter is designed for use with compressed air and nitrogen. If the meter will be used at pressures below 15 psig, consult CDI about velocity limitations. The air must be free of oil, dirt that could foul the probes, and suspended water droplets. In a compressed-air application, the meter should be installed downstream of a dryer. Each meter is calibrated for a specific size and type of pipe. If a meter will be used in a type or size of pipe that is not listed, consult CDI about a special calibration.

The meter is not to be used in safety or life-support applications. It should not be used as a sole means of determining required capacity of air compressors and related equipment. The meter must not be used in wet or hazardous locations.

INSTALLATION

Drilling the holes to install the meter will release some metal shavings into the pipe. When planning the installation, make sure that all downstream equipment is protected by filters, or take other precautions to ensure that shavings do not reach critical equipment or get blown out in a way that could cause injury.

For best accuracy, the meter should be installed with at least 20 diameters of straight pipe upstream and three diameters downstream. Avoid installing the meter downstream of any item that could distort or concentrate the flow, such as a partially-closed valve, a regulator, a filter or moisture separator, two closely-spaced elbows in different planes, a long-radius elbow or a curved hose. Allow at least 30 diameters of straight pipe between any such item and the meter. Select a location that meets these requirements and also provides good visibility from the plant floor. If this is not possible, consider using the remote display discussed below.

To install the meter, first shut off the supply of air to the pipe where the meter will be mounted and allow the pressure to bleed down. Clamp the drill guide firmly to the pipe, orienting it for best visibility of the meter. Drill the two holes and remove any resulting burrs from the outside of the pipe. Make sure the outside surface of the pipe is clean and smooth.

Once the pipe is prepared, remove the back halves of the rings, insert the probes into the holes in the pipe with the flow arrow pointing in the proper direction, and re-assemble the rings. Tighten the cap screws firmly and evenly so that the gaps between the halves of the rings are about equal on both sides of the pipe. If the display is upside down, remove the cover of the meter, rotate it 180 degrees, and re-install it.

MILLIAMP AND PULSE OUTPUTS

The meter has an isolated, unpowered, milliamp output. The meter is shipped with a jumper in place to power the output from the instrument's dc supply. With the jumper in place, the meter will source a dc signal. The pulse output is an open collector, referenced to the instrument ground. For applications in which a contact-closure output is required, the isolated pulse output (CDI 5200-IPO) should be used. It installs inside the meter.

RANGES AND SCALING

Displays are available in scfm, Nm3/min and Nm3/hr. The published scale range of each meter is its calibrated range; the meter will continue to function, at reduced accuracy, at higher and lower flow rates. The milliamp output increases linearly from four milliamps at zero flow to 20 milliamps at a pre-determined flow rate that is displayed for a few seconds as the meter starts up. The pulse output produces five pulses for each standard cubic foot of air in all meter sizes.

POWER SUPPLY

Each meter is furnished with a wall-plug dc supply for 110 V to 230 Volt AC main with a 6-foot (1.5 M) cable plus a 14-foot (4.2 M) extension cable. Prongs for US, European and UK outlets are provided, as appropriate. The meter may alternatively be hard wired to a 24-Volt dc supply.

ACCESSORIES

Drill Guide

For pipe sizes three inches and larger, the drill guides are half rings that bolt to the back halves of the meter rings (CDI 5400-XX-DG). For the two- and 2-1/2 inch sizes, a single drill guide is used (CDI 5400-S-DG). There is also a universal drill guide (CDI 5400-U-DG) for all 5400 sizes. Each of the drill guides is furnished with a 3/16 inch drill bit and a hex wrench. Please note that the 5200-DG drill guide cannot be used with the 5400-series flowmeters.

Summing Remote Display (CDI 5200-SRD)

The summing display can be programmed to operate in any of three modes: rate display (the same flow rate shown on the meter), cumulative usage, and usage during the previous day. It can be used either as a remote readout, for situations in which the meter is not readily visible, or as a way to monitor usage over time.

LIMITED WARRANTY

CDI warrants solely to the buyer that the Model 5400 Flowmeter shall be free from defects in materials and workmanship, when given normal, proper and intended usage, for three years from the date of purchase. During the warranty period, CDI will repair or replace (at its option) any defective product at no cost to the buyer. The foregoing warranty is in lieu of any other warranty, express or implied, written or oral (including any warranty of merchantability or fitness for a particular purpose). CDI's liability arising out of the manufacture, sale or supplying of the flowmeter, whether based on warranty, contract, tort or otherwise, shall not exceed the actual purchase price paid by the buyer, and in no event shall CDI be liable to anyone for special, incidental or consequential damages.

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CDI Meters Compressed Air Flowmeter Connection Instructions

For use with HOBO® H22, U12, U30, UX90-001x, UX120-006M, and UX120-017x data loggers, HOBO ZW data nodes, and Pulse Input Adapters (S-UCC-M00x and S-UCD-M00x)

Applies to these CDI Flowmeters:

Onset Part No.	Output*	Nom. Pipe Size	CDI Part No.
T-CDI-5200-10S	4-20mA representing 0 to 100 scfm of air	1 in.	5200-10S
T-CDI-5400-20S	4-20mA representing 0 to 600 scfm of air	2 in.	5400-20S

This document provides instructions on connecting the CDI Compressed Air Flowmeters listed above to each of the following:

- FlexSmart™ Analog Module and 4-20mA cable used with HOBO H22 series data loggers
- Analog Sensor Port option and 4-20mA cable used with HOBO U30 series data loggers
- 4-20mA cable used with HOBO U12 and UX120-006M data loggers
- 4-20mA cable or adapter cable used with HOBO ZW series data nodes

This also includes wiring details for connecting to a pulse output for the HOBO 4-Channel Pulse Input data logger (UX120-017x), HOBO UX90 state logger (UX90-001x), and Pulse Input Adapters (S-UCC-M00x and S-UCD-M00x).



CDI Compressed Air Flowmeter
(Onset Part No. T-CDI-5200-10S shown)

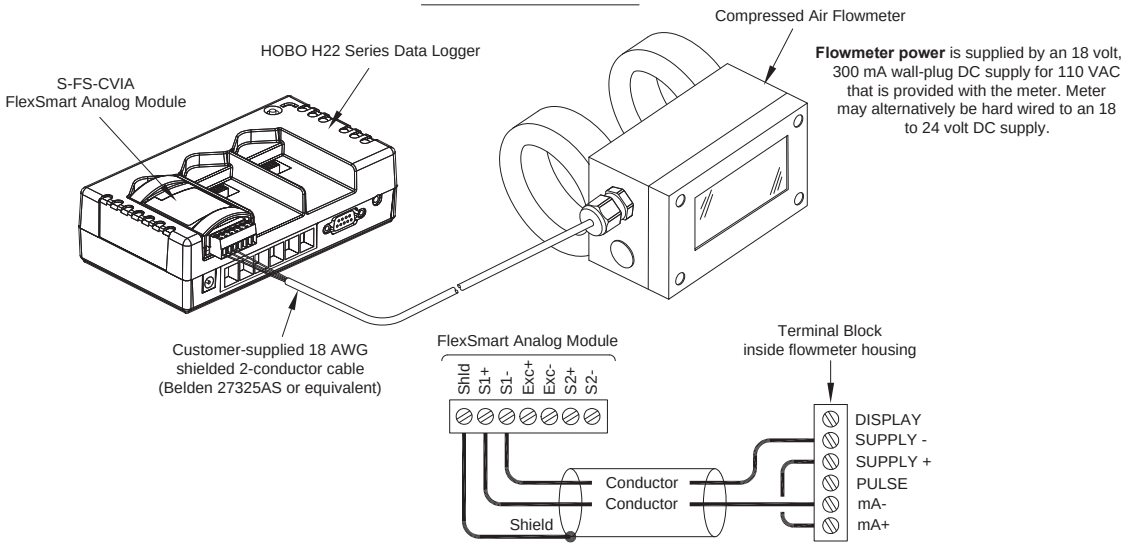
It also lists configuration values used by HOBOware® Pro software to configure the logger for each flowmeter. **Note:** For flowmeter details, refer to the documentation provided by CDI Meters.

Required:

- Selected CDI Flowmeter
- HOBO H22, U12, U30, UX90-001x, UX120-006M, or UX120-017x data logger, or HOBO ZW data node or Pulse Input Adapter (S-UCC-M00x and S-UCD-M00x)
- FlexSmart Analog Module, Onset Part No. S-FS-CVIA (for H22 series); Analog Sensor Port option (for U30 series); 4-20mA cable, Onset Part No. CABLE 4-20mA (for all series)
- HOBOware® Pro Software, version 2.2.1 or higher (2.4.0 or higher for U30 series; 3.0 or higher for ZW series; 3.6 or higher for UX120-006M)
- Customer-supplied length of 18 AWG, shielded, 2-conductor cable (Belden 27325AS or equivalent recommended)

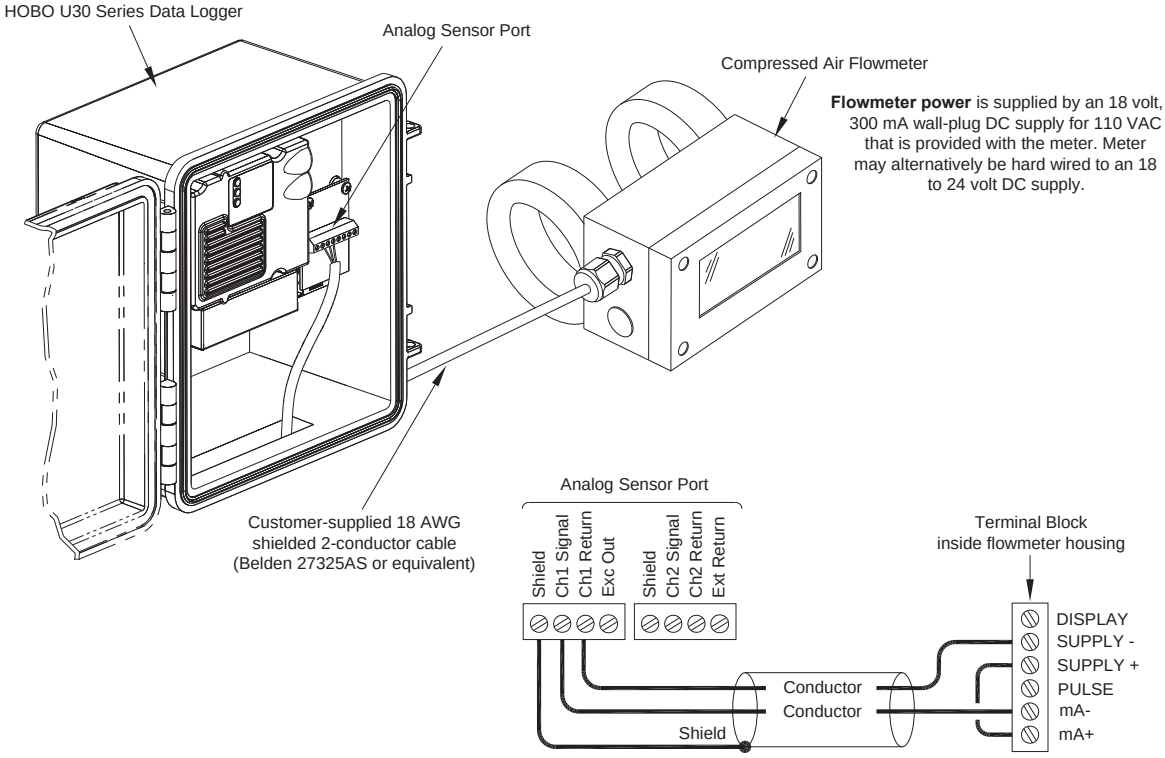
Connecting the Flowmeter to the Analog Module or Port:

H22 Connection

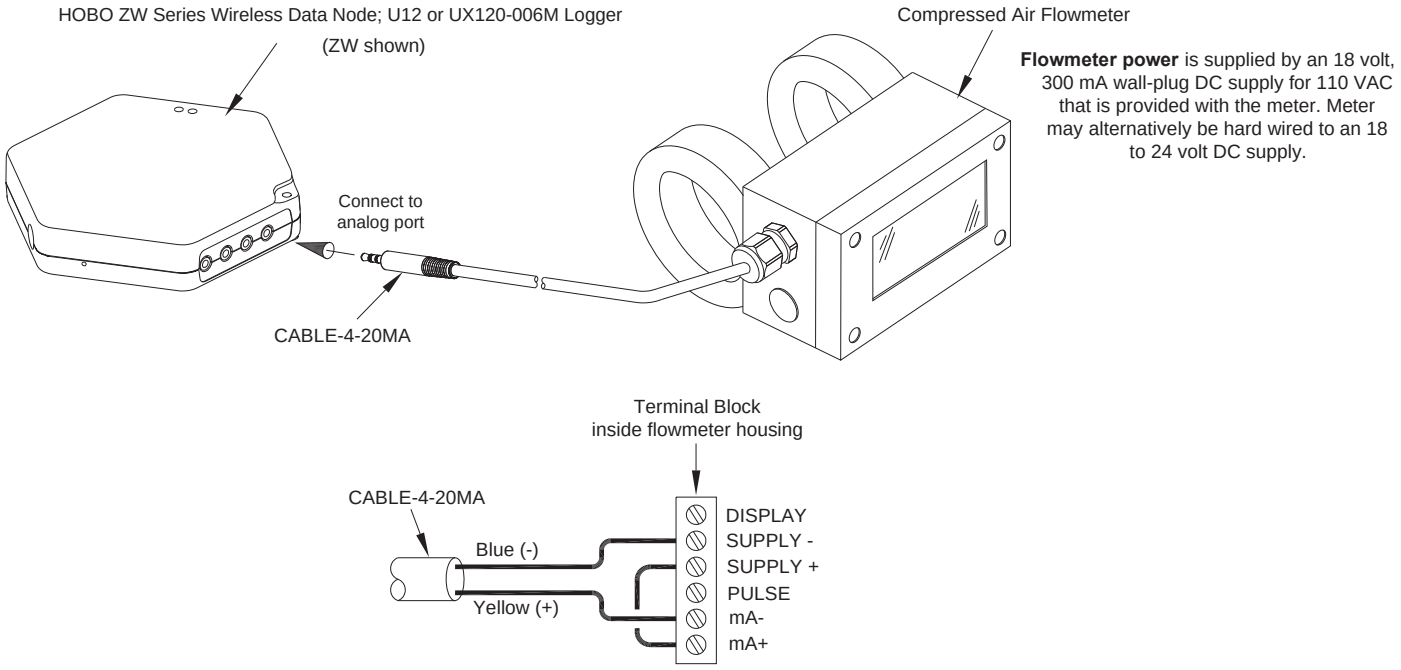


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U30 Connection



ZW, U12, and UX120-006M Connection



Configuring the Logger or Data Node for the Flowmeter, using HOBOware Pro Software:

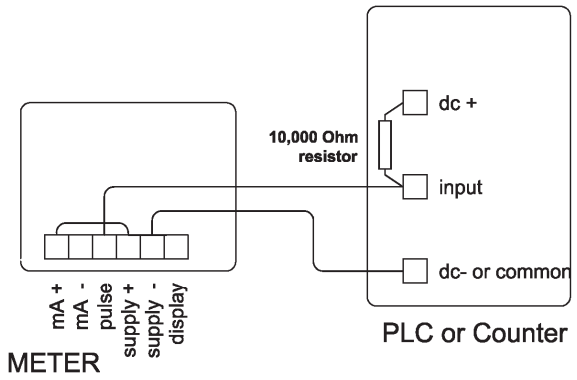
HOBOware Pro software provides configuration files for the flowmeter. The table below lists the recommended configuration values that these files contain. For information on loading configuration files, refer to the software documentation.

Onset Part Nos.	Channel Name	Measurement Type	Raw Value 1	Raw Value 2	Raw Units	Scaled Value 1*	Scaled Value 2*	Scaled Units
T-CDI-5200-10S	Air Flow	Current	4	20	mA	0	200	scfm
T-CDI-5400-20S	Air Flow	Current	4	20	mA	0	600	scfm

* 4-20-mA output represents ranges shown. *Calibrated* ranges are 1 to 80 scfm for T-CDI-5200-10S and 3 to 350 scfm for T-CDI-5400-20S. Accuracy will be reduced when flow is outside of calibrated range.

Connecting the Flowmeter to Pulse Output

Use this wiring diagram when connecting a CDI Flowmeter to a logger or sensor with pulse output, including the HOBO 4-Channel Pulse Input Data Logger (UX120-017x), HOBO UX90 State Logger (UX90-001x), and Pulse Input Adapters (S-UCC-M00x and S-UCD-M00x).



Note that the supply- terminal is normally grounded to the pipe on which the meter is mounted.

WIRING FOR PULSE OUTPUT CDI Meters, Inc.
June 1, 2005

When using HOBOware to launch a HOBO 4-Channel Pulse Input Data Logger (UX120-017x) or HOBO UX90 State Logger (UX90-001x) connected to a CDI Flowmeter, select Raw Pulse > Counts > Raw Pulse for the sensor in the Launch Logger window. For these two loggers or the Pulse Input Adapters, click the Scaling button in the Launch Logger window. Choose the Pulse Scaling Assistant, and enter your scaling factor.

testo 6740

Humidity Monitoring in Compressed Air

Increase safety - Cut costs



°C tpd

°F tpd

°C td_{atm}

°F td_{atm}

% RH

ppm_v

mg/m^3

°C / °F

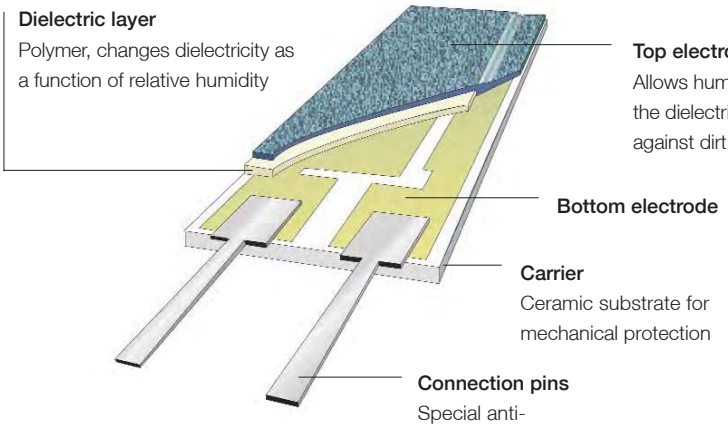
The humidity sensor

Optimal for trace humidity measurement

The testo humidity sensor is generally calibrated at several points to ensure minimum deviations. For trace humidity measurement, a high-precision reference measurement (dewpoint mirror) is used to help carry out a calibration at -40 °CtP (pressure dewpoint).

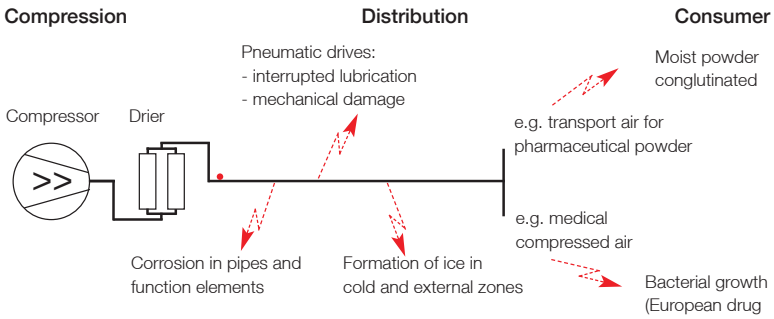
To demonstrate the accuracy of testo's humidity sensors, five sensors were extensively tested in a large number of international calibration institutes over a 5-year period. All the measurement results confirmed the high accuracy of 1% RH.





Monitor trace humidity, avoid damage

Dry air, compressed air and dry gases are used in all areas of industry. Humidity is normally undesirable because it can cause damage or impair the quality of the end product, as the graphic underneath shows.



- That's why you need the testo 6740 for effective trace humidity measurement



Granulate drying: dry air is a requirement for product quality



Compressed air systems: drier monitoring to avoid damage caused by humidity



Medical compressed air: minimum humidity as a hygiene requirement



Gas engineering: humidity causes damage and reduces the value of the gas in the system

Safeguard quality - Cut costs

What is compressed air quality?

The international standard ISO 8573 defines seven classes of compressed air quality and lays down the humidity, the oil content, the particle content etc. which the compressed air is allowed to have. Class 1 represents the highest requirements. Class 4 is satisfied if, for instance, the pressure dewpoint does not exceed 3 °CtP or 37 °FtP or an absolute humidity of 6 g water vapour per m^3 or 8,150 ppm_V (parts per million, relative to the volume).

The main way of ensuring compliance with a quality class involves installing a suitable drier. Its monitoring and, where appropriate, its control (see below), is handled by the testo 6740.

How can costs be reduced?

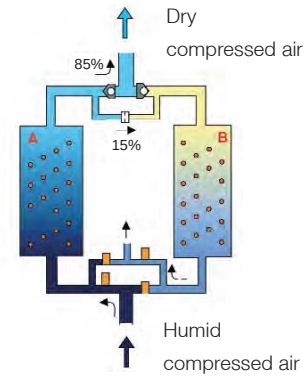
Of course, the main reason for using the testo 6740 is to monitor and avoid excessive humidity in the system so as to avoid damage (cf. p. 2 below). In addition, dryer operating costs can be reduced sharply.

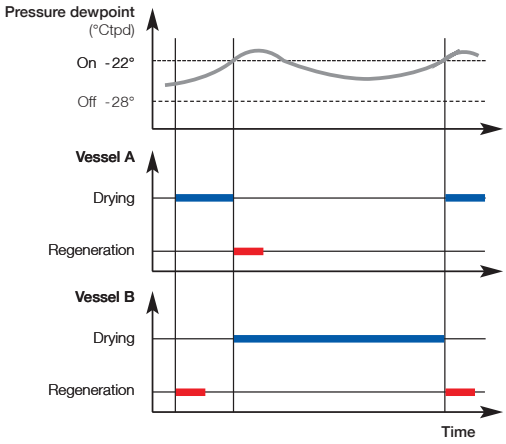
ISO 8573	Trace humidity				Typical application
Class	°Ctpd	°Ftpd	g/m³	ppm_V	
1	-70	-94	0.003	4	Semi-cond. prod.
2	-40	-40	0.12	163	Granulate drier
3	-20	-4	0.88	1200	Transport air
4	3	37	6	8150	Pneu. tube conveyor
5	7	44	7.8	10600	Vacuum eng.
6	10	50	9.4	12800	Working/energy air
7	-	-	-	-	Blow air

Equipment	Compressed air drier
Monitoring/ Control	testo 6740

Adsorption driers:

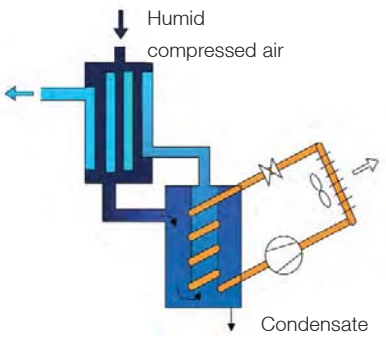
If chamber switchover is humidity-controlled using the testo 6740 rather than being time-controlled (see diagram on the right), the dry phases (blue) are normally much longer than the regeneration phases (red). During this time no regeneration air must be generated, so that the compressors can be reduced from 100% to about 85% volumetric flow rate. This results in significant savings in operating costs.

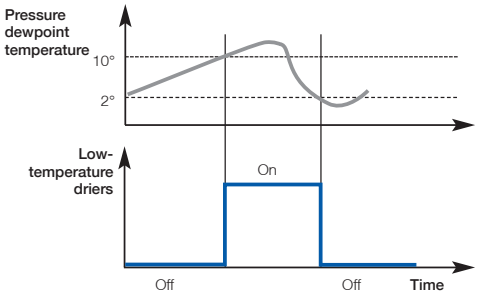




Cooling driers:

In non-critical systems, low-temperature driers can be switched off completely when air humidity is low (e.g in the winter). The testo 6740 supplies the humidity measurement here as well. If the humidity surges that occur when the low-temperature driers are switched on are to be avoided, a downstream low-temperature drier can be kept in continuous operation to trap this humidity. This results in tangible savings in operating costs.





Features and benefits

- **Maximum reliability**
 - Long-term stability, testo humidity sensor applied 100,000 times over
 - Demonstrably correct indication of measurement ranges and data
 - Highest manufacturing quality
- **Calculation of the most important trace humidity variables**
 - e.g. °Ctpd, °Ctd atmospheric, ppm_v
- **Calibration protocol**
- **Convenient operation**
 - Via the display menu without additional aids
 - Without display via the internal interface and scaling adapter software (cf. p. 6)
 - Local 1-point calibration

- **Analog output** 4 .. 20 mA (2-wire)
- 2 limit signal outputs (optional)
 - Pre- and main alarm as floating contact
 - 2 LEDs displaying the alarm status

Bright 7-segment **display** (optional)
- Housing can be rotated by 350°



The long-term stable **testo humidity sensor** with protocolled precision calibration at residual humidity -40 °Ctpd

Ultra-easy **menu operation** (cf. p.6) via buttons
- Select the humidity variable
- Change the scaling
- Set alarms, incl. hysteresis
- Carry out local 1-point calibration
- Test analog signal and alarm outputs
- Call up historic min./max. values

The right **process connection**
- G 1/2 or NPT 1/2"
- Pressure-tight up to 50 bar
- With optional measurement chamber

Technical data testo 6740

Housing	
Material	Plastic, polyacrylamide
Dimensions	199.5x37x37 (with analog output plug) 203.5x37x37 (with limit signal output plug)
Ambient temperature	–20 ... 70 °C
Storage temperature	–40 ... 80 °C
Protection type	IP 65
Rotation of housing	By 350° (to align display)
Sensor and sensor protection	
Humidity sensor	testo humidity sensor with protocolled trace humidity adjustment at –40° Ctpd
Temperature sensor	NTC
Sensor guard	Sintered stainless steel cap
Meas. uncertainty	
Humidity	+/– 1 K at 0 °Ctpd
	+/– 3 K at –20 °Ctpd
	+/– 4 K at –40 °Ctpd
Temperature	+/– 0.5 K (0 ...50 °C)
Limit signal outputs (optional, 0554.3302)	
Contacts	2 floating NO contacts, max. 30 V/0.5 A
Operating points	Standard: 4 °/12 °CtP, with freely programmable display

Measuring range	
Pressure dewpoint temperature (trace humidity)	– 60 to +30 °Ctpd at pressure dewpoints < 0 °Ctpd display of frost point, at > 0 °Ctpd of dewpoint
Temperature	0 ... 50 °C
Atmospheric dewpoint (cf. diagram on p.7)	– 80 ... – 15 °Ctd (at 30 bar rel.) – 70 ... + 10 °Ctd (at 3 bar rel.) – 60 ... + 30 °Ctd (at 0 bar rel.)
Pressure resistance	testo 6740: Up to 50 bar absolute Measurement chamber 0554.3303: Up to 15 bar absolute
Analog output	
Signal	4 ... 20 mA, two–wire
Scaling	Freely scalable via display/buttons Standard: 4 ...20 mA = –60 ... +30 °Ctpd
Output variables	°Ctpd, °Ftpd, °CtA (atm. dewpoint), °FtA, %RH, ppm_v, mg/m^3, °C, °F
Resolution	12 Bit
Accuracy	+/– 40 µA
Supply	
Voltage 24 VDC (10 ... 30 VDC allowed);	with alarm plug (0554 3302) 20 to 28 VDC
Max. load	10 VDC: 100 Ohm, 30 VDC: 950 Ohm, cf. p.7
EMC	According to Directive 89/336 EEC

System components, ordering details

Customised combinations

Every measuring point can be optimally configured. With or without a display, with European G 1/2 thread or American NPT 1/2" thread. With or without limit signal output. Directly assembled, with measurement chamber or with cooling coil. All combinations are possible, ensuring your needs are met optimally.

The 4 types of the testo 6740 family

	without display	with display
G 1/2	0555.6741	0555.6743
NPT 1/2"	0555.6742	0555.6744



Standard: Analog output
4 ..20 mA (2-wire)

Optional (0554 3302):
2 limit signal outputs integrated
Analog output 4 ..20 mA (2-wire)
+ 2 limit signal outputs (floating)
+ 2 LEDs



Ordering data testo 6740	Order no.
Basic instrument (incl. plug for analog signal output)	
testo 6741, G $^1/_2$ thread, without display	0555 6741
testo 6742, NPT $^1/_2$" thread, without display	0555 6742
testo 6743, G $^1/_2$ thread, with display	0555 6743
testo 6744, NPT $^1/_2$" thread, with display	0555 6744
Accessories	
Cable connection plug for analog output 4 ... 20 mA, with	
2 floating switch contacts and 2 LEDs	0554 3302
Measurement chamber (for 6741, 6742), up to 15 bar	0554 3303
Cooling coil (up to 200 °C, use only with measurement chamber)	0554 3304
Scaling adapter for testo 6741 / 6742 incl. software	0554 3305
ISO calibration certificate, two calibration points (–10 °/–40 °Ctp at 6 bar)	0520 0136
ISO calibration certificate, pressure dewpoint (–40 °...0 °Ctpd at 6 bar)	
Basic costs	0520 0116
Per calibration point (please indicate)	0520 0116
External display testo 54–2AC, 2 limit signal outputs (up to 300 VAC, 3 A), supply 230 VAC	5400 7553
2 m teflon tube with compressed air connections	0669 2824/4
Power supply (bench unit) 90...264 VAC / 24 VDC (350 mA)	0554 1748
Power supply (DIN rail mounting) 90...264 VAC / 24 VDC (3 A)	0554 1749

Selection advice: choosing the right components for your application

A For process temperatures > 50 °C (up to 200 °C), use a cooling coil (0554.3304) & measurement chamber (0554.3303).

B Use a measurement chamber (0554.3303) for rapid assembly (no depressurising before installation) and better response time from the sensor (flow past sensor can be infinitely adjusted)

A B For dirty, oily media, connect a 40 µm filter upstream

C If neither A nor B is required: just screw directly into the G1/2 or NPT 1/2" thread. Depressurised tube required during installation.

EN For atmospheric dry air (e.g. granulate driers), a teflon tube is used and the valve of the measuring chamber is opened fully. At process temperatures > 50 °C, connect a cooling coil upstream.



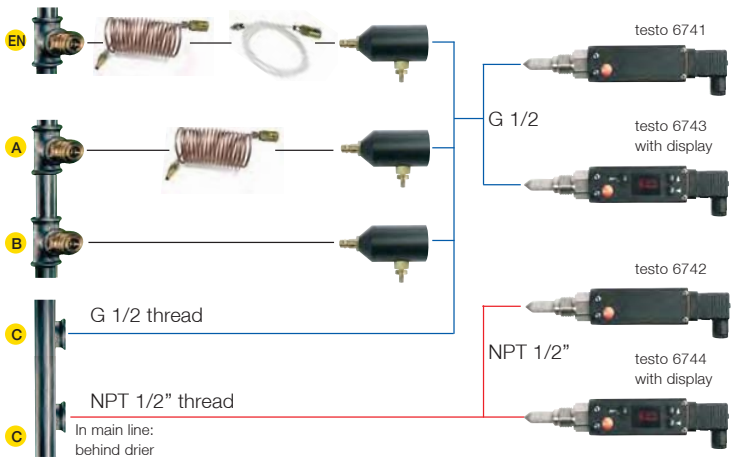
Measurement chamber (0554 3303) for optimal flows past the sensor (valve can be infinitely adjusted) and quick installation



Cooling coil (0554 3304) for process temperatures 50 ...200 °C (only with measurement chamber)



Teflon tube (0669 2824/4) for dry air



The ideal operating concept

Easy to operate with or without a display

Does the unit have to be changed from °Ctpd to ppm_V or do the operating points need to be corrected? These and many other settings can be easily configured via the display. Or - and this is particularly advantageous for OEM customers such as manufacturers of compressed air driers - these adjustments can be handled by a PC running the scaling adapter software 0554.3305, even without a display.



With display, testo 6743, testo 6744



Without display, testo 6741, testo 6742

The display and buttons enable ultra-easy menu operation with maximum convenience for the user

- Change units
- Change scaling
- Single-point calibration
- Reset

cf. below "The display menu"

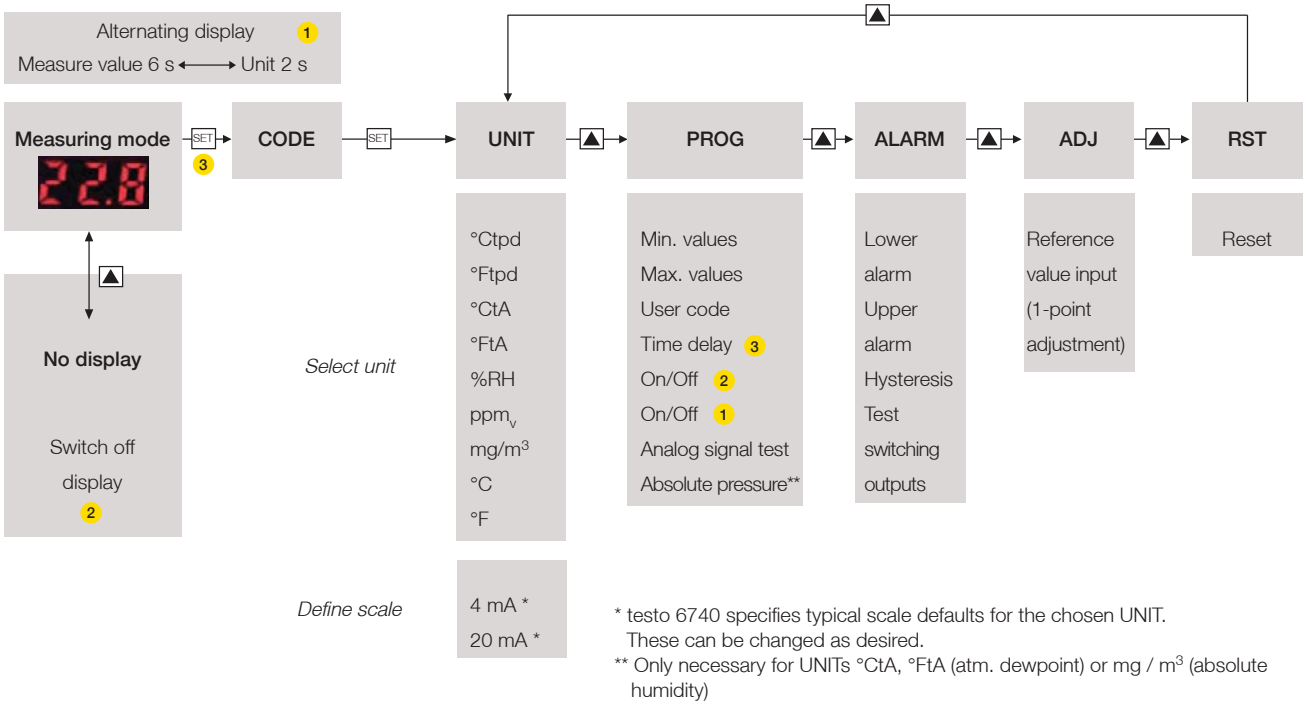
- Set absolute pressure
- Display min./max. value
- Test analog output
- Set/test limit signal output etc.

The scaling adapter software permits mobile access, perfect for OEM or service personnel

- Firmware version
- Digital values
- Keyboard test
- Further information

The display menu

Fully oriented to field requirements: Alternating display value and unit, option of switching off the display, password protection, unit selection, etc. Try it out! You will certainly appreciate the intuitive operation.



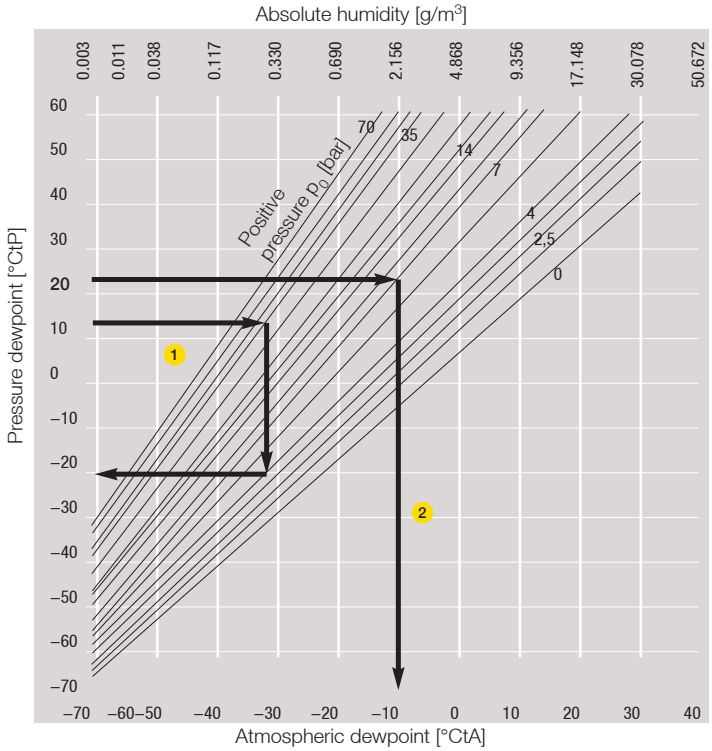
* testo 6740 specifies typical scale defaults for the chosen UNIT. These can be changed as desired.

** Only necessary for UNITs °CtA, °FtA (atm. dewpoint) or mg / m^3 (absolute humidity)

Pressure dewpoint or atmospheric dewpoint? - Wiring

Pressure dewpoint or atmospheric dewpoint?

Atmospheric air is able to store more water vapour than compressed air. If the compressed air is cooled down, it reaches its dew point ("pressure dewpoint" in °CtP or °FtP) at higher temperatures, while atmospheric air can be cooled down further until condensate is first produced ("atmospheric dewpoint" in °CtA or °FtA).
Only the pressure dewpoint is relevant to the monitoring of compressed air systems for trace humidity because this indicates how far away the "danger threshold" (= dewpoint) is. Since some users are accustomed to working with an atmospheric dewpoint, however, the testo 6740 allows the option of outputting both the pressure dewpoint and the atmospheric dewpoint (the absolute process pressure is input for the latter).



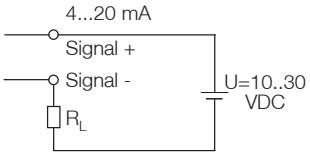
1 Pressure dewpoint (35 bar) is relieved to 4 bar. The pressure dewpoint thus falls from 10 °CtP to -23 °CtP

2 Compressed air (7 bar) has a pressure dewpoint of 20 °CtP. This corresponds to an atmospheric dewpoint of -8 °CtA.

The electrical wiring

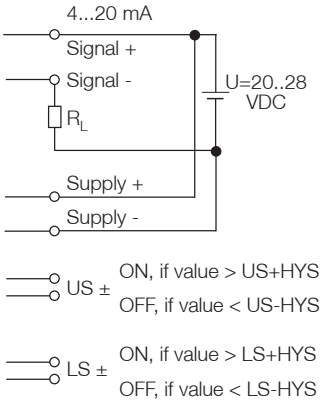


Standard plug (4..20 mA, 2-wire)





With switch contact plug
Order no. (0554 3302)
(4..20 mA, 2-wire plus 2 floating switch contacts):
8-core cable



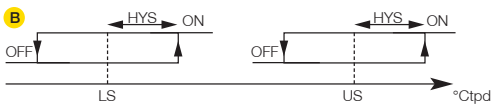
What is R_L?

The total resistance of the 2-wire connection, consisting of the line, and possibly an external display and control unit

R_L = Load impedance, external load

U	A	B
10 V	300 Ohm	-
24 V	650 Ohm	650 Ohm
30 V	950 Ohm	-

LS = Lower Switch US = Upper Switch



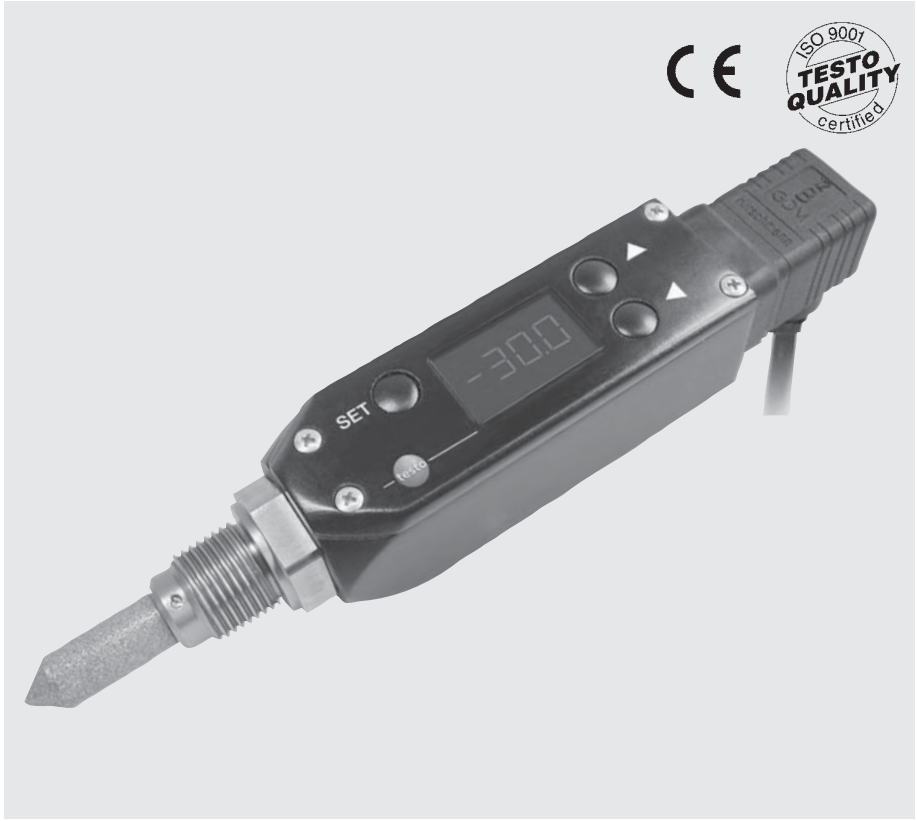
Subject to change without notice.

0981.2194/hd/AC/11.2003

testo 6740

Instruction manual

GB



Preface/Copyright

Preface

Dear Testo Customer

Congratulations for choosing a Testo product. We hope that you will enjoy many years of using the product and that it will help you in your work.

If problems should occur which you cannot rectify yourself, please consult our service department or your dealer. We will endeavour to provide fast and competent assistance to save you long periods out of operation.

Copyright

This documentation is subject to the copyright of Testo AG. Reproduction and employment contrary to the justified interests of Testo AG are prohibited without the prior, written consent of the company.

We reserve the right to modify technical details from the descriptions, specifications and illustrations contained in this documentation.

testo AG
Postfach 11 40
79849 Lenzkirch
Germany

General information

This Instruction manual contains important information about the features and use of the product. Please read this document through carefully and familiarise yourself with the operation of the product before putting it to use. Keep the Instruction manual to hand so that you can refer to it when necessary.

Pictograms

This product could be dangerous if operated incorrectly. Information that requires particular attention is identified in this Instruction manual by pictograms:

Warnings are identified by means of a warning triangle. The relevant **signal word!** indicates the degree of risk:



Signal word!

Warning! means: Serious physical injury could occur if you do not take the precautionary measures indicated.

Caution! means: Slight physical injury or material damage could occur if you do not take the precautionary measures indicated.

Pay particular attention to warnings and take the precautionary measures indicated in order to avoid danger.

! Notes on special cases and peculiarities in the handling of the product are indicated by an exclamation mark.

Standards/Approvals

CE According to the conformity certificate, this product fulfills all 89/336/EEC guidelines.

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Testo worldwide 26

1. Basic safety information

Avoid electrical hazards:

- Never take measurements with the instrument and its probes on or near live components unless the instrument is expressly approved for current and voltage measurements.

Protect the instrument:

- Never store the unit together with solvents (e.g. acetone).

Preserving product safety/warranty entitlement:

- Operate the instrument only within the parameters specified in the Technical data.
- Handle the instrument appropriately and according to its intended purpose.
- Never apply force!
- Temperature data on sensors/probes refer only to the measurement range of the sensors. Do not subject handles and lines to temperatures greater than 70°C if they are not expressly approved for higher temperatures.
- Open the instrument for maintenance and repair purposes only if specifically described in the Instruction Manual.
- Maintenance work should only be carried out if described in the Instruction Manual. Please adhere to the steps described. For safety reasons, please only use spare parts from Testo.

 Any additional work should only be carried out by authorised trained personnel. Otherwise Testo does not accept responsibility for the functioning of the instrument following maintenance and for the validity of approvals.

Dispose of carefully:

- Dispose of defect rechargeable batteries as well as empty batteries responsibly.
- Once its service life has come to an end, return the instrument to us and we will dispose of it.

2. Intended use

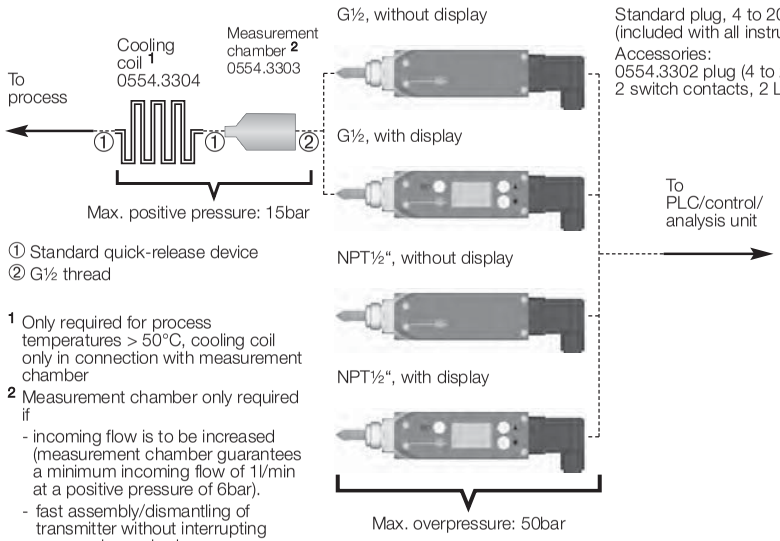
The instrument is intended for use in the following applications:

The testo 6740 instrument is a pressure dew point transmitter for measuring trace humidity. It is used in the following areas:

- Monitoring trace humidity in compressed air systems and gas networks (e.g. pipeline and container drying).
- Controlling and monitoring (compressed air) driers.
- Monitoring compressed air humidity in vehicles.
- Monitoring humidity and temperature in medical compressed air or granulate driers.

3. Product description

3.1 System components



3.2 Operating elements

The instruments with the article numbers 0555.6741 and 0555.6742 do not have any additional operating elements.

The instruments with the article numbers 0555.6743 and 0555.6744 have a keypad and a display to input and read off settings (See 5. Menu guide, p. 12).

3.3 Settings

The parameters in the instrument are assigned the following values in the factory:

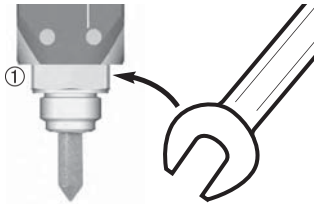
Parameter	Pressure dew point [1]		Atmospheric dew point [1]		Relative humidity	Temperature		Absolute humidity	
Unit	°Ctp	°Ftp	°CtA	°FtA	%rF, %rh, %Hr	°C	°F	ppm_v	mg/m^3 (Abs)
4mA	–60	–75	–60	–75	0	0	32	0	0
20mA	30	85	30	85	100	50	120	30000 [2]	30000 [2]
LS	4	40	4	40	30	10	50	8400	7000
US	12	55	12	55	50	30	85	13000	9600

[1] With dew point temperatures <0°Ctp/<0°CtA/<32°Ftp/<32°FtA the frostpoint temperature (dewpoint upon ice) is displayed

[2] Display is shown to the power of ten: 30E3 (corresponds to 30 x 10^3 = 30 x 1000 = 30000)

4. Initial operation

4.1 Mechanical assembly



We recommend you wrap the thread of the process connection in sealing tape (e.g. Teflon) or place it in a copper gasket (inner diameter: 21mm).

▶ Force should only be applied to the Allen screw ①.

There are 3 different options for assembly depending on the application:

Assembly	Application
Without measurement chamber and cooling coil	– Process temperatures 0 to 50°C – It is possible to attach sensor directly in process – No quick assembly/dismantling of testo 6740 required and flow on sensor is sufficient (1l/min)
With measurement chamber	– Process temperatures 0 to 50°C – Fast assembly/dismantling of testo 6740 required and/or flow on sensor is insufficient (1l/min)
With measurement chamber and cooling coil	– Process temperatures 50 to 200°C

Without measurement chamber and cooling coil

Warning

Compressed air!

Risk of injury!

▶ Depressurise pipe sections (e.g. compressor off or use bypass) and aerate before opening.

1 Screw process connection (G½ or NPT½“) into the matching thread.

The housing can be rotated by 350°. Do not use force when aligning.

2 Set up housing so that the display can be easily read.

3 Complete aeration of pipe section and apply pressure to pipe section.

With measurement chamber (max. 15bar)

1 Screw in process connection (G½) of the testo 6741/6743 transmitter in measurement chamber thread.

2 Snap quick-release lock of measurement chamber in standard socket of compressed air line.

With measurement chamber and cooling coil (max. 15bar)

1 Screw in process connection (G½) of testo 6741/6743 transmitter into thread of measurement chamber.

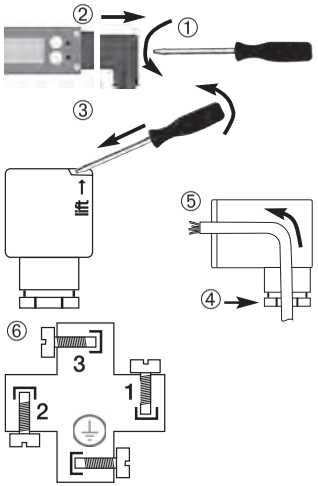
2 Snap quick-release lock of measurement chamber in the quick-release lock of the cooling coil.

3 Snap second quick-release lock of the cooling coil into the standard socket of the compressed air line.

4.2 Electric connection

Standard plug

We recommend an 8 wire cable with a tightly braided screen and a core cross-section of 0.2 to 0.5mm².



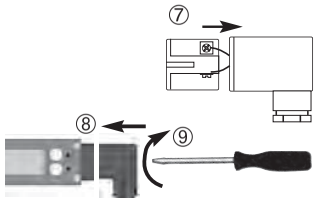
1 Loosen and remove ① screw at the back of the plug and remove plug from transmitter ②.

2 Remove plug socket from the plug housing. To do this apply a small screwdriver to the point marked with "lift" and press out carefully ③.

3 Screw on the cable positioning device ④ and guide the cables through the plug housing ⑤.

4 Connect cable ends to the screw terminals of the plug socket ⑥:

Plug socket terminals
1: + (4 to 20mA), power: 12...30VDC
2: – (4 to 20mA)
3: Not assigned
4: Measuring earth (cable screen)

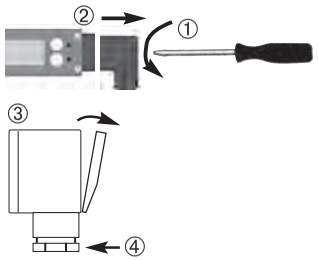


5 Insert plug socket into plug housing again until it snaps into place ⑦ and screw on cable fixing unit.

6 Attach plug to transmitter ⑧ and secure with screw ⑨.

0554.3302 plug (with 2 switch outputs)

We recommend an 8 wire cable with a tightly braided screen.



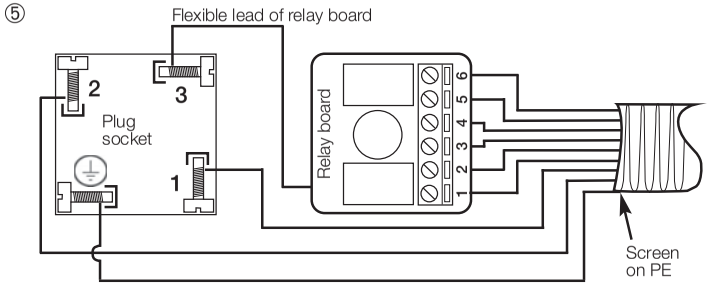
1 Loosen and remove screw ① at the back of the plug and remove plug from transmitter ②.

2 Tilt the cover of the plug housing at an angle and remove ③.

3 Remove plug socket from the front and the relay board from the back out of the plug housing.

4 Screw on cable positioning device ④ and guide cables through the plug housing.

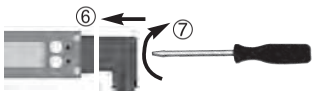
5 Connect cable ends to the screw terminals of the relay board or the plug socket ⑤:



The supply lines need to be galvanically connected, so connect either Ⓐ - Ⓐ or Ⓑ - Ⓑ!

Plug socket terminals			Relay board terminals		
1:	I+ (4 to 20mA)	Ⓐ	1: 20 to 28VDC		Ⓐ
2:	I– (4 to 20mA)	Ⓑ	2: LS+		
3:	(connected to relay board in factory)		3: LS–		
⏚:	Put on screen		4: US+		
			5: US–		
			6: 0VDC		Ⓑ

Current signal and supply 20 to 28VDC



6 Push plug socket and plug board into the plug housing (pay attention to alignment) and close lid.

7 Screw on cable positioning device.

8 Attach plug to transmitter ⑥ and screw into place ⑦.

4.3 Analog output/Limit signal outputs

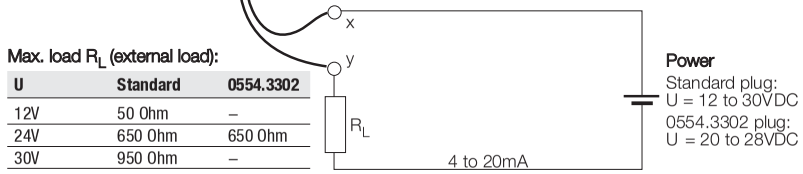
Standard plug/0554.3302 plug

Both plug variations have a 4 to 20mA analog output available in two-wire technology.



x,y connection:

Connection	Standard	0554.3302
x	Terminal 1	Terminal 1
y	Terminal 2	Terminal 6



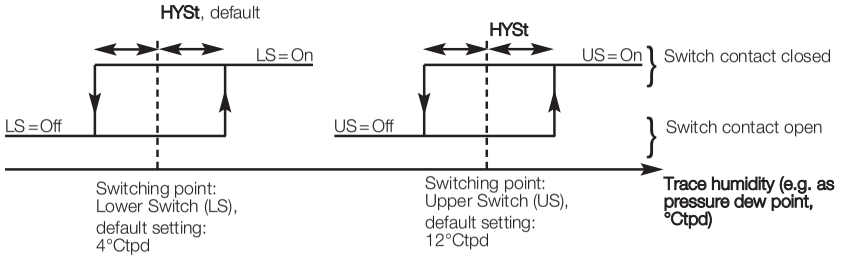
Max. load R_L (external load):

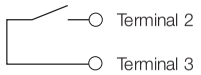
U	Standard	0554.3302
12V	50 Ohm	–
24V	650 Ohm	650 Ohm
30V	950 Ohm	–

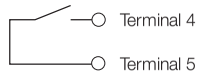
Power
Standard plug:
U = 12 to 30VDC
0554.3302 plug:
U = 20 to 28VDC

Limit signal outputs with 0554.3302 plug

Two floating contacts (NO contact) are available.

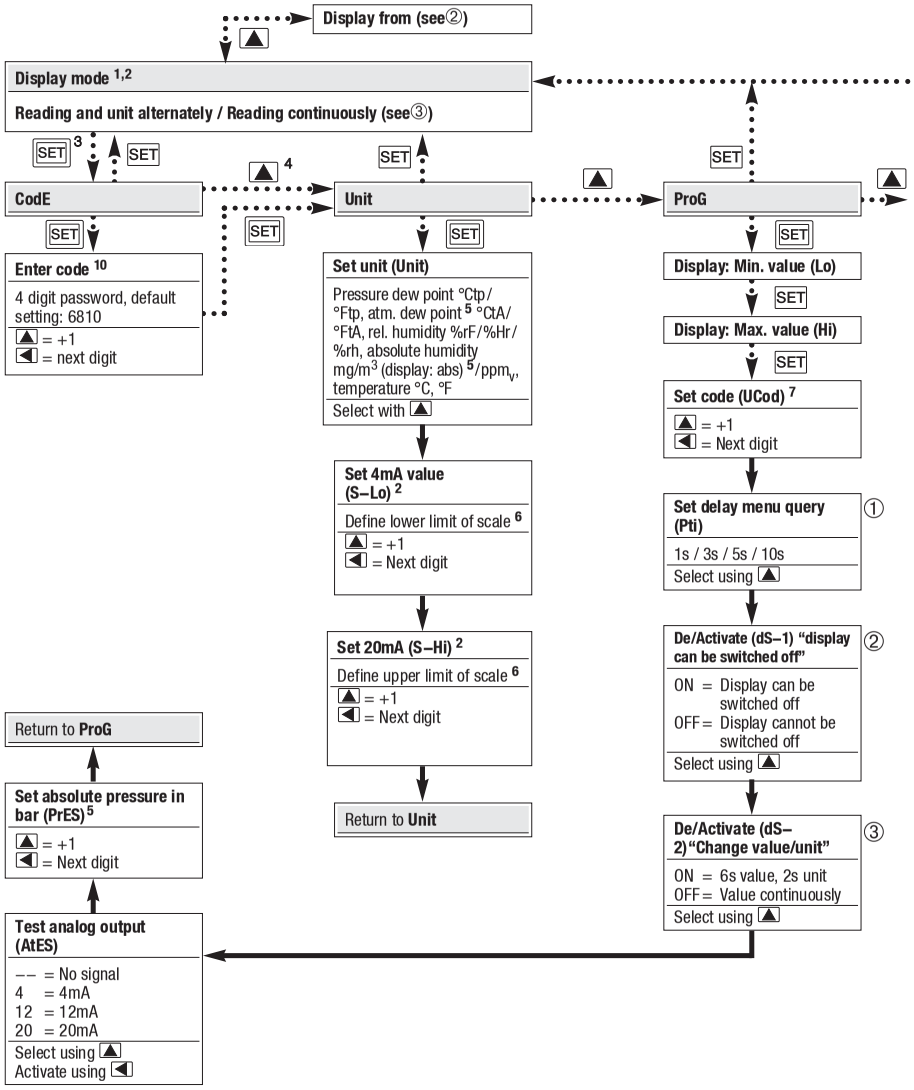






Max. circuit:
30V DC/ 0.5A

5. Menu guide (0555.6743/0555.6744 only)



Signs and symbols:

SET Press button briefly.

SET Keep button pressed for 2s.

Change menu using button specified.

Save input using SET and change menu **or** change menu using SET without saving input.

Notes:

1 If there are breaks in the input, the system returns automatically to the display mode after approx. 1min.

2 In the case of the units ppm and Abs (mg/m3), values are displayed/entered to the power of ten. Examples: 15E1 corresponds to 15 x 10 = 150, 02E2 corresponds to 2 x 100 = 200, 21E3 corresponds to 21 x 1000 = 21000

3 Keep button pressed (1s/3s/5s/10s, corresponding to setting in ①, default setting: 5s).

4 Only with deactivated code (can be set in Prog - UCod menu).

5 Absolute pressure (can be set in Prog - Pres menu) is included in the calculation for absolute humidity (Abs) and atmospheric dew point (°Ctp/°Ftp).

6 For negative values: select "-" at left digit position.

7 To deactivate codes: Enter 0000.

8 Can only be used together with the 0554.3302 plug.

9 Menu is only available if one of the following units is set: °Ctp, °Ftp, %rF, %Hr or %rh (can be set in Unit menu). Also see 6. Adjustment on site, p. 16.

10 General password (always valid): 6810

6. Adjustment on site

One point adjustment by inputting one reference value

Using one point adjustment, you can enter a reference value for a working point (e.g. -10°Ctpd) specified by you. In this way you will achieve a minimum target/actual deviation from this working point.

As a reference, you will need a dew point mirror or a reference measuring instrument (e.g. testo 400, testo 650) with a pressure dew point probe.

! The **Adj** menu in which the reference value is entered is only available if one of the following units is set: °Ctp, °Ftp, %rF, %Hr or %rh (See 5. Menu guide, p. 14, Unit menu, Setting unit).

1 Expose reference measuring instrument and testo 6740 to identical, constant conditions and await adjustment time.

2 Measure reference value and compare with testo 6740 reading.

3 If there are deviations in the values, enter reference value in **Adj** menu.

7. Care and Maintenance

Filter, measurement chamber, cooling coil

If process conditions are oily or dusty, the stainless steel sintered filter should be cleaned and also the measurement chamber and cooling coil should be cleaned if used.

▶ Unscrew/remove filter, measurement chamber and cooling coil, purge with compressed air or place in an ultrasonic bath.

Sensor cleaning

▶ Unscrew the filter and rinse the sensor carefully with water or ethanole. Let dry well.

8. Troubleshooting

Fault	Possible causes	Remedy
Analog output values too low/too high	– Incorrect scaling or unit	▶ Change scaling or unit in **Unit** menu
No signal	– Connection interrupted **or** – Supply voltage too low – Polarity incorrect	▶ Check cables ▶ Check power: Standard plug min. 12VDC 0554.3302 plug: min. 20VDC
Signal >21mA	– Sensor defect (broken).	Sensor must be replaced. ▶ Contact your local distributor or Testo´s Customer Service.
Singal <4mA	– Sensor corroded	Sensor must be replaced. ▶ Contact your local distributor or Testo´s Customer Service.
Display "oF"	– No signal from sensor	▶ Contact your local distributor or Testo´s Customer Service.

If the fault cannot be repaired by following the suggestions given in the above table, please contact your local distributor or Testo`s Customer service department.

9. Technical data

9.1 Measurement ranges and accuracies

Type of mreasurement	Measurement range	Accuracy
Pressure dew point temperature (trace humidity)	–60 to +30°Ctpd	±1K at ±0°Ctp ±3K at –20°Ctp ±4K at –40°Ctp (at 25°C)
atm. dew point	–80 to –15°Ctd at 30 bar_{rel} –70 to +10°Ctd at 3 bar_{rel} –60 to +30°Ctd at 0 bar_{rel}	cf. pressure dew point temperature
Temperature	±0 to +50°C	±0.5K

9.2 Additional instrument data

Characteristic	Values
Supply voltage	24VDC (standard plug: 12 to 30VDC allowed, 0554.3302 plug: 20 to 28VDC allowed)
Max. load	Standard plug: 12V: 500hm, 24V: 6500hm, 30V: 9500hm 0554.3302 plug: 12V: not allowed, 24V: 6500hm, 30V: not allowed
Ambient temperature	–20 to +70°C
Storage/transport temperature	–20 to +80°C
Protection classIP65	(with plug attached and cable connected)
Rotatability (display alignment)	350°
Humidity sensor	Testo humidity sensor with logged trace humidity–adjustment at –40°Ctp/6bar
Temperature sensor	NTC
Sensor protection	Stainless steel sintered cap
Pressure resistance	–1 bar_{rel} to +50 bar_{abs} Measurement chamber 0554.3303: max. 15 bar_{abs}
Dimensions	199.5x37x37 (with standard plug), 203.5x37x37 (with 0554.3302 plug)
Analog output	
Signal	4 to 20mA, two–wire technology
Scaling	Standard: 4 to 20mA = –60 to +30°Ctpd, with freely scalable display
Output parameters	°Ctp, °Ftp, °CtA, °FtA, %RH, ppm_v, mg/m^3, °C, °F
Resolution	12bit
Accuracy	±40µA
Limit value outputs (optional, only with 0554.3302 plug)	
Contacts	2 NO contacts, potential–free, max. circuit 30V/0.5A
Operating points:	Standard: +4°Ctp/12°Ctp, freely programmable with display

10. Accessories/Spare parts

Name	Part no.
Basic instruments (incl. plug for analog signal output)	
with process connection G1/2, without display	0555 6741
with process connection NPT1/2", without display	0555 6742
with process connection G1/2, with display	0555 6743
with process connection NPT1/2", with display	0555 6744
Accessories	
Cable connection plug for power/analog output 4 to 20 mA, with 2 floating switch contacts and 2 LEDs (limit signal output, alarm output)	0554 3302
Measurement chamber for optimum flow on humidity sensor, max. 15 bar, for thread G½	0554 3303
Cooling coil for process temperatures above 50 °C (up to 200 °C)	0554 3304
ISO calibration certificate for pressure dew point (–40° to 0° Ctp at 6 bar), free choice of points	0520 0116
ISO calibration certificate for pressure dew point at –10° Ctp and –40° Ctp	0520 0136

Warranty

Testo grants a warranty of 2 years from the date of the initial purchase for this product. The warranty covers all material and manufacturer faults.

Faults occurring during the warranty time will be rectified by Testo AG, its authorised sales subsidiaries or authorised dealers in accordance with the following conditions and without charge for labour and material costs.

Either the defective components will be replaced with new spare parts or the entire product will be replaced according to Testo`s estimation.

The following are excluded from the manufacturer's warranty:

Wear parts (e.g. rechargeable batteries/batteries, printing mechanisms) and consumables (e.g. printer paper).

- Damage caused by:
 - use contrary to the intended purpose or failure to observe the instruction manual and/or the safety instructions,
 - lack of care, accidents or normal wear,
 - external influences (e.g. damage during transport, damage caused by vibration, excess heat, water, moisture or acids),
 - use of unsuitable accessories.

This warranty expires if:

- the type or serial number of the product is changed, deleted, removed or made illegible
- repairs or modifications are undertaken by third parties or unauthorised persons.

This warranty covers none of the following items:

- regular maintenance and repairs or the replacement of parts due to normal wear,
- the costs of packaging and transport,
- transport risks incurred directly or indirectly in connection with this warranty,
- the costs of repairs, adjustments or similar measures taken beyond the extent of this warranty.

In the case of a warranty claim, consult your dealer or the sales subsidiary responsible for your country. The addresses can be seen at **www.testo.com**.

Enclose a brief description of the fault and the purchase receipt, indicating the delivery and purchase dates, together with the product. Please also give us your telephone number for any inquiries.

Warranty repairs do not extend the period of warranty.

Further claims of any kind against Testo such as commercial transformation, price reduction or compensation will not be processed.

Please contact your nearest Testo office or distributor for more information.

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Fax (2) 89 23 23 17
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Tel. (212) 2 17 01 55
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Enviro engineering (W.L.L.)
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Dubai
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envireng@emirates.net.ae

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C. A.
San Antonio de los Altos,
Edo. Miranda
Tel. (2) 3 72 77 70
Fax (245) 5 71 67 74
gminter@cantv.net

Sermatic srl
Carabobo
Tel. (45) 71 36 35
Fax (45) 71 36 35
nugece@cantv.net

VIETNAM
MTC
Measuring and Testing
Equipment Company Ltd.
Hanoi
Tel. (4) 7 33 36 36
Fax (4) 7 33 21 03
mtc-hn@hn.vnn.vn

SMICO
Scientific Equipment &
Measuring and Testing
Hanoi
Tel. (4) 8 53 26 92
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smico@fpt.vn

Stand: 03.06.2003
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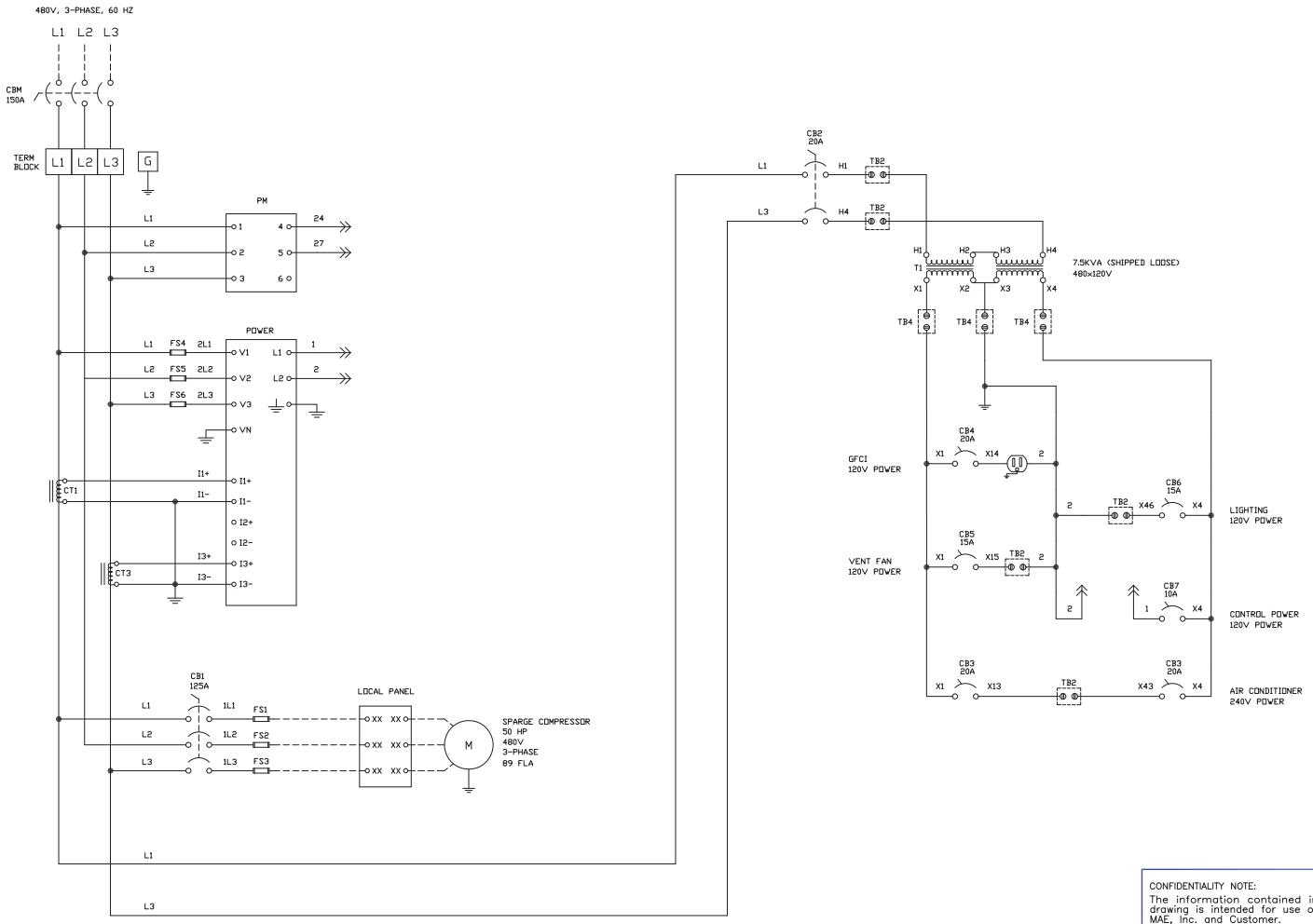
03.06.2003
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0971.6740/T/dr/08.03

MAE² MID-ATLANTIC ENVIRONMENTAL EQUIPMENT

SECTION 4:

CONTROL PANEL



UL508A LISTED

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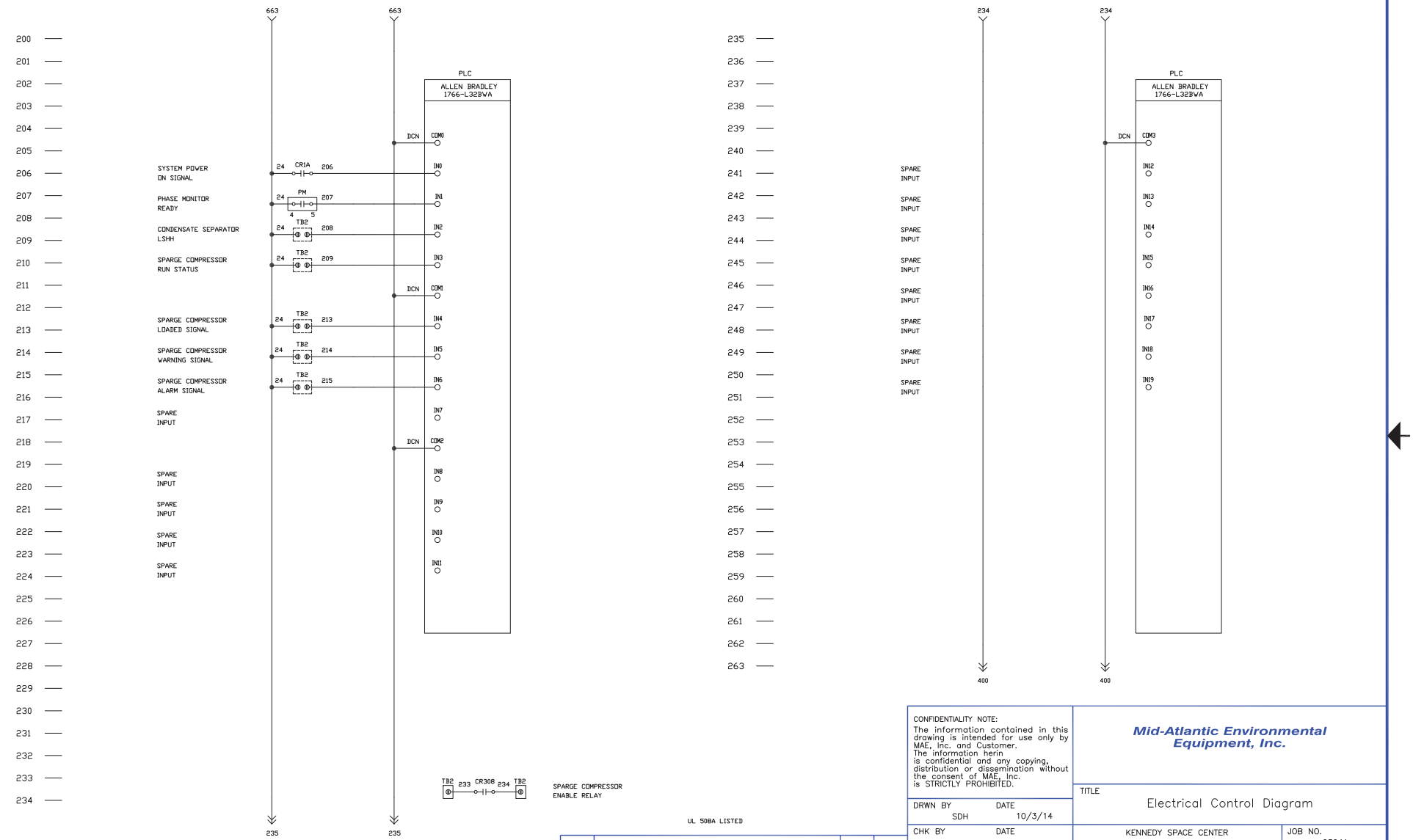
REV.	DESCRIPTION	DATE	APPR.
	REVISIONS		

DRWN BY SDH DATE 10/3/14
CHK BY DATE
APPR BY DATE

TITLE: Electrical Control Diagram

KENNEDY SPACE CENTER | JOB NO. 23041

SCALE	SIZE	DWG NO.	SHEET	REV
N/A	B	23041SHS	1 OF 9	PRELIM

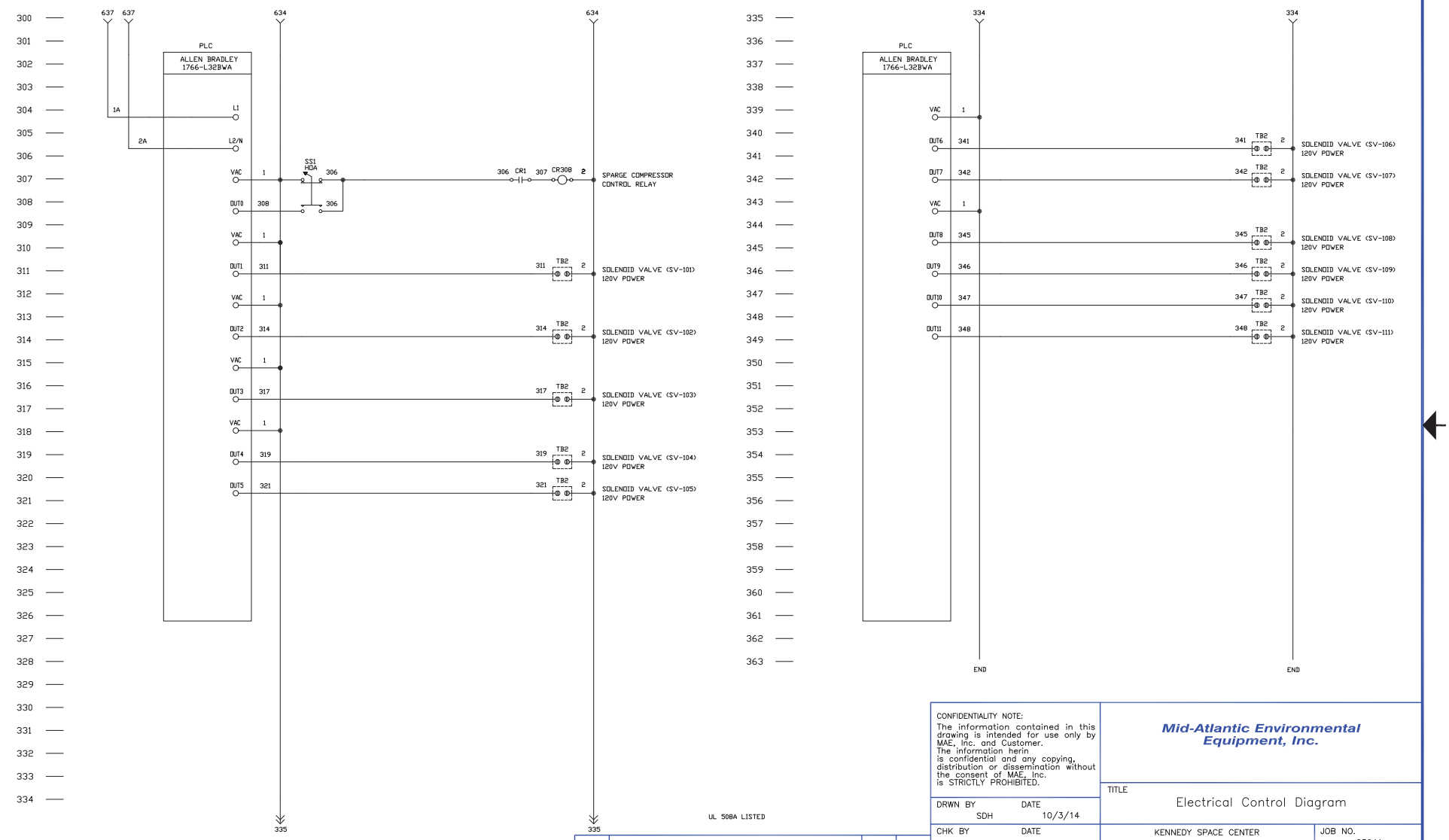


REV.	DESCRIPTION	DATE	APPR.
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CHK BY	DATE	KENNEDY SPACE CENTER	JOB NO. 23041
APPR BY	DATE	SCALE: N/A / SIZE: B / DWG NO. 23041SHS	SHEET 2 OF 9 / REV PRELIM



UL 508A LISTED

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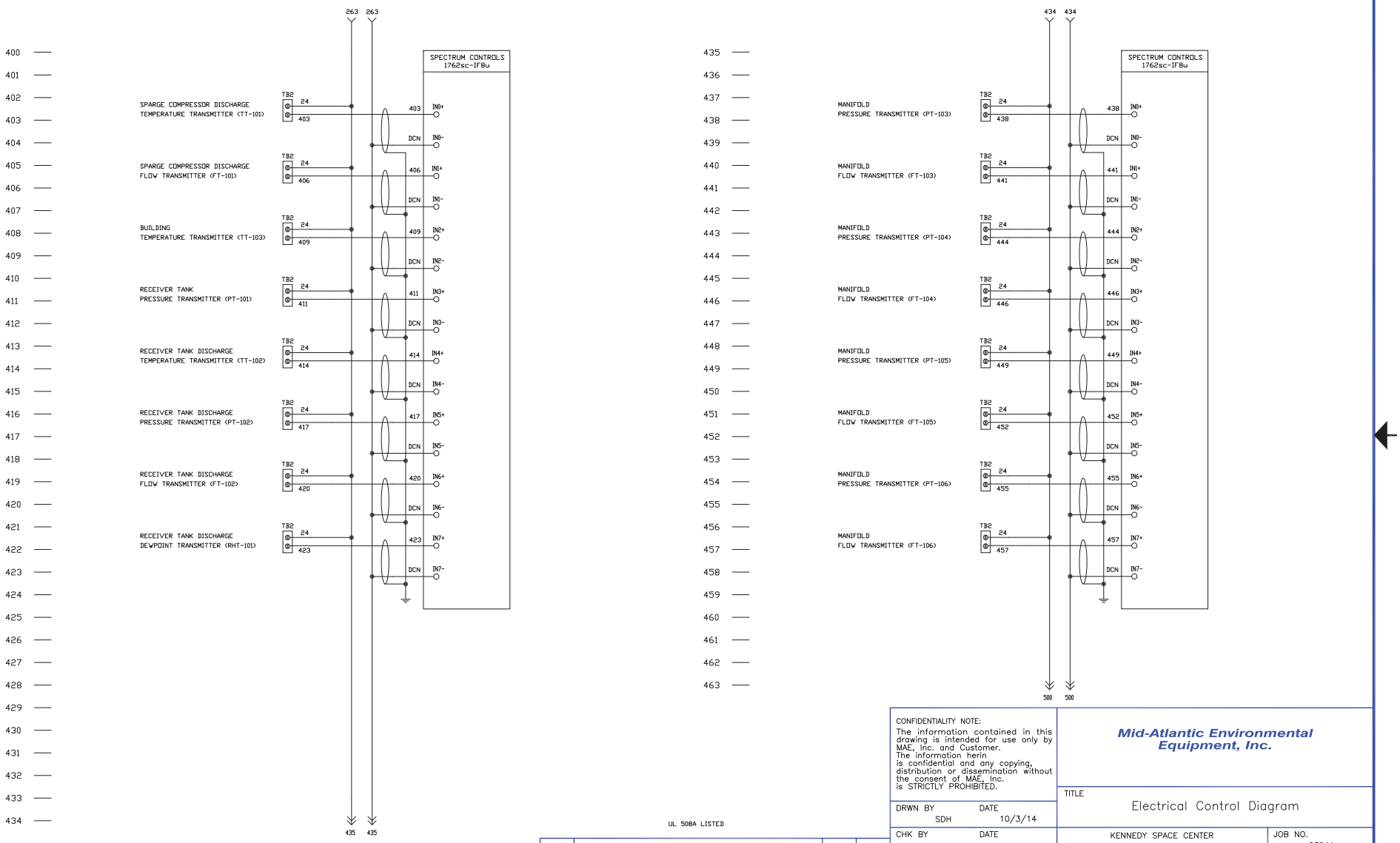
DRWN BY	SDH
DATE	10/3/14
CHK BY	
DATE	
APPR BY	
DATE	

TITLE: Electrical Control Diagram

KENNEDY SPACE CENTER

JOB NO. 23041

SCALE	SIZE	DWG NO.	SHEET	REV
N/A	B	23041SHS	3 OF 9	PRELIM



UL 508A LISTED

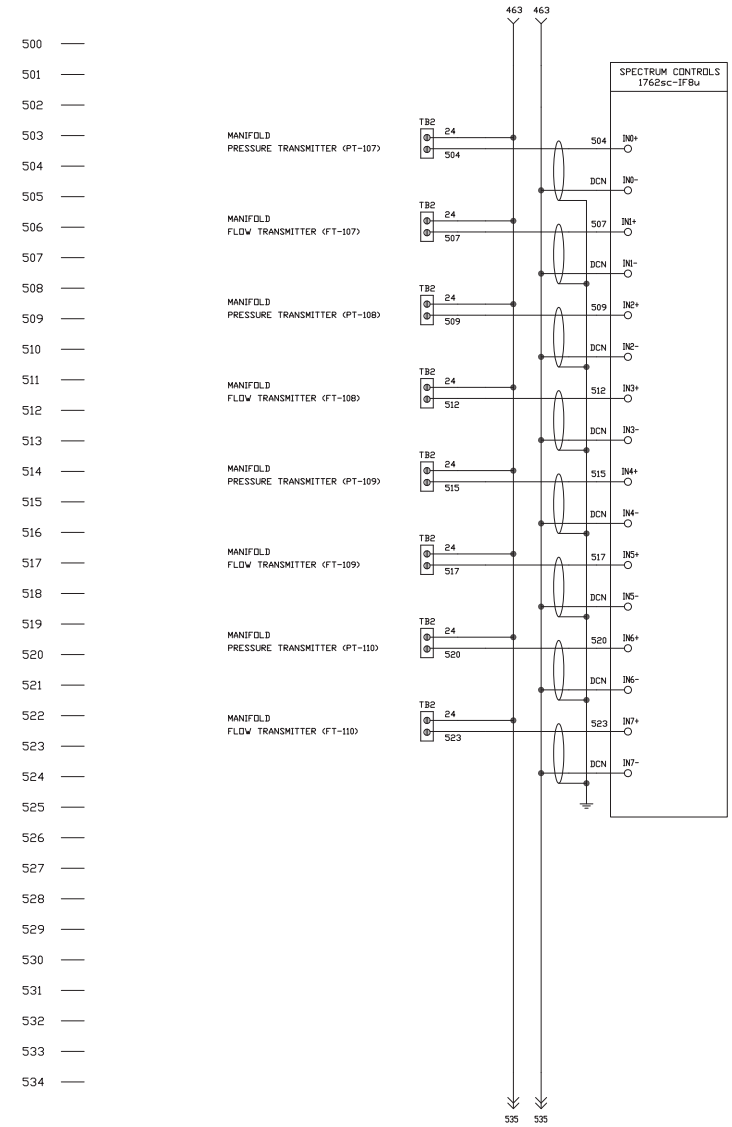
REV.	DESCRIPTION	DATE	APPR.
REVISIONS			

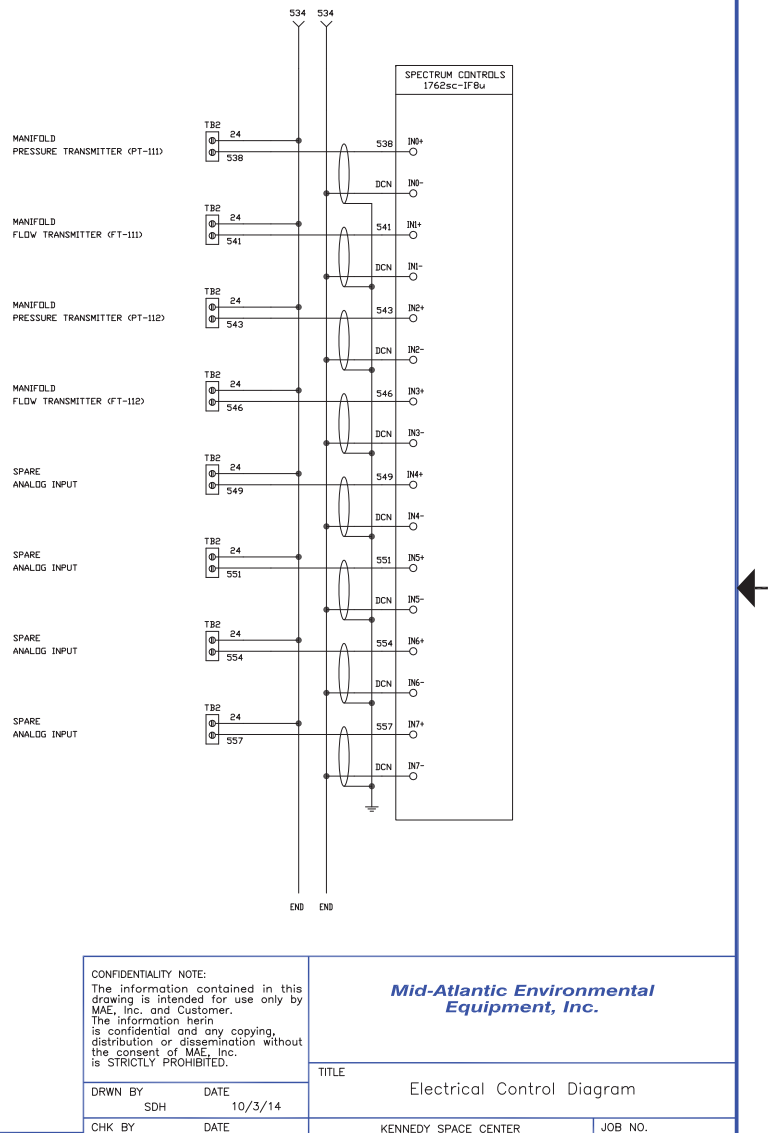
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TITLE: Electrical Control Diagram

DRWN BY: SDH	DATE: 10/3/14	KENNEDY SPACE CENTER		JOB NO. 23041		
CHK BY	DATE					
APPR BY	DATE	SCALE N/A	SIZE B	DWG NO. 23041SHS	SHEET 4 OF 9	REV PRELIM





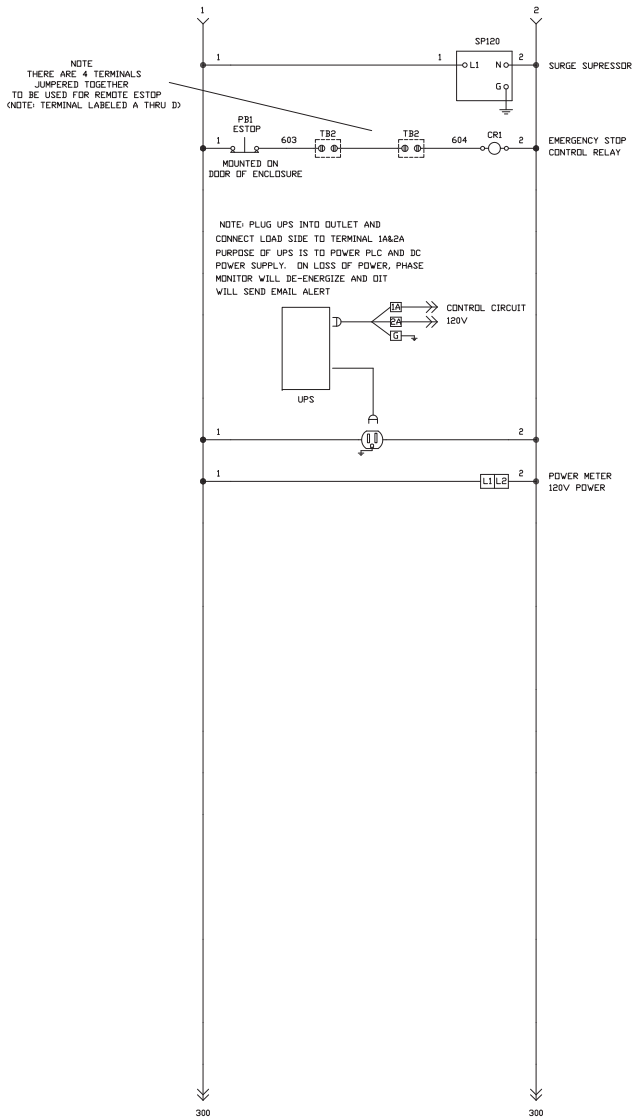
UL 508A LISTED

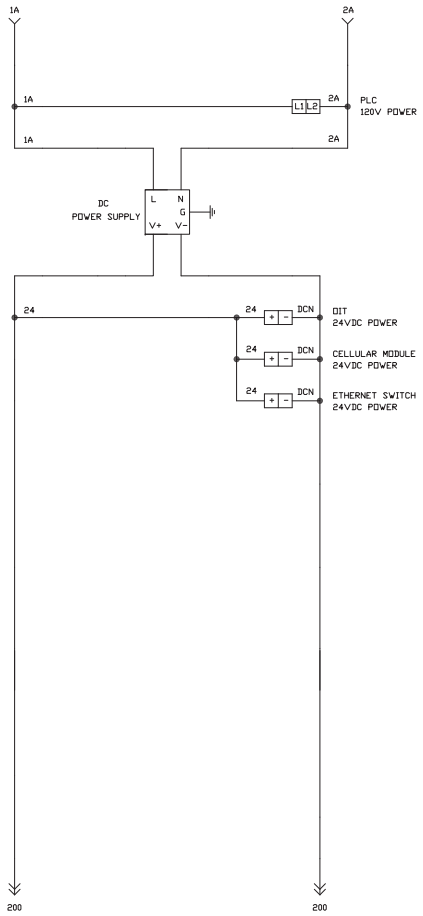
REV.	DESCRIPTION	DATE	APPR.
REVISIONS			

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DRWN BY SDH	DATE 10/3/14	TITLE: Electrical Control Diagram	
CHK BY	DATE	KENNEDY SPACE CENTER	JOB NO. 23041
APPR BY	DATE	SCALE N/A / SIZE B / DWG NO. 23041SHS	SHEET 5 OF 9 / REV PRELIM





UL 508A LISTED

REV.	DESCRIPTION	DATE	APPR.
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DRWN BY	SDH
DATE	10/3/14
CHK BY	
DATE	
APPR BY	
DATE	

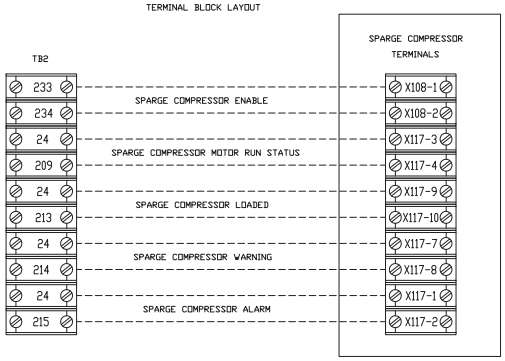
TITLE: Electrical Control Diagram

KENNEDY SPACE CENTER

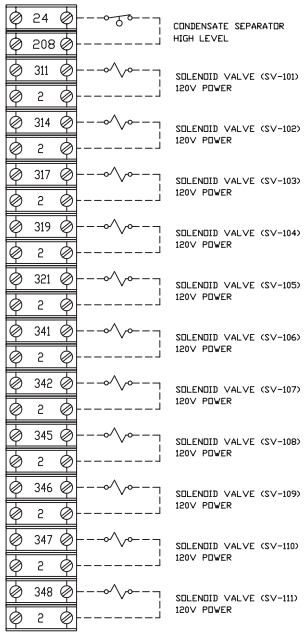
JOB NO. 23041

SCALE	SIZE	DWG NO.	SHEET	REV
N/A	B	23041SHS	6 OF 9	PRELIM

TERMINAL BLOCK LAYOUT

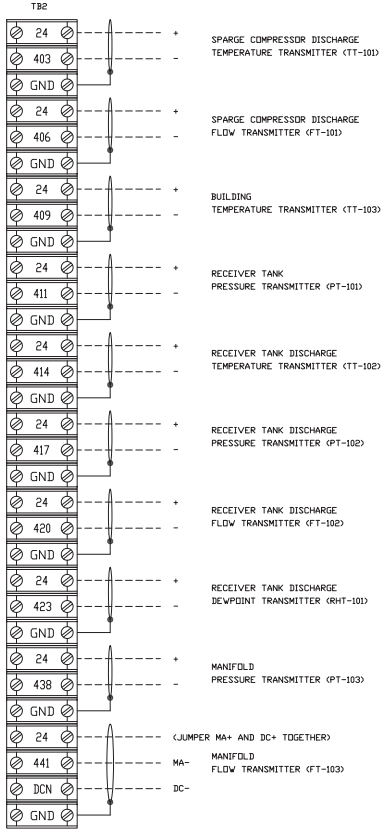


TB2



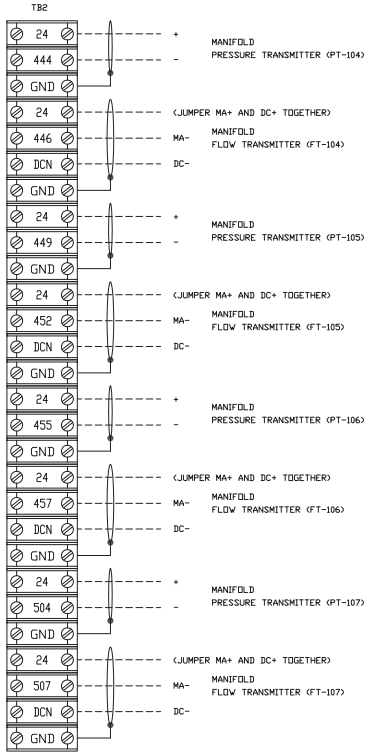
TERMINAL BLOCK LAYOUT

TB2



TERMINAL BLOCK LAYOUT

TB2



UL 508A LISTED

REV.	DESCRIPTION	DATE	APPR.
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DRWN BY SDH	DATE 10/3/14
CHK BY	DATE
APPR BY	DATE

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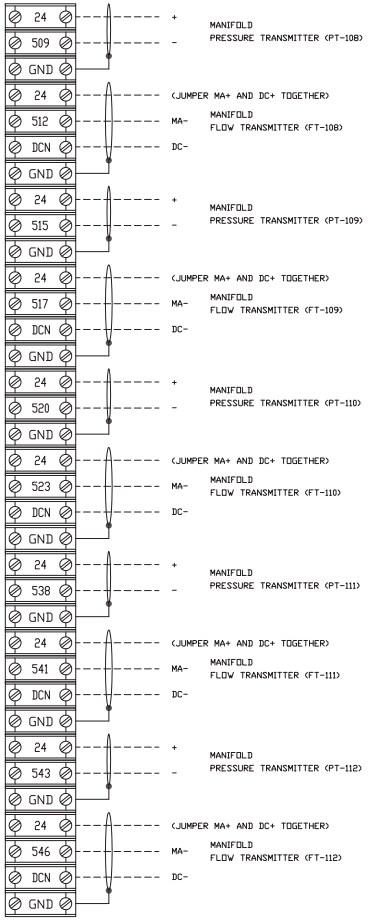
TITLE: Electrical Control Diagram

KENNEDY SPACE CENTER | JOB NO. 23041

SCALE	SIZE	DWG NO.	SHEET	REV
N/A	B	23041SHS	7 OF 9	PRELIM

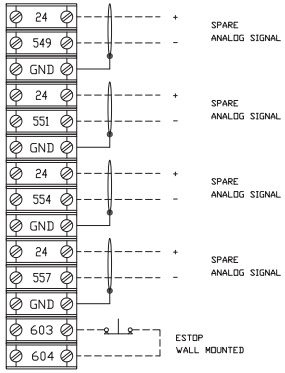
TERMINAL BLOCK LAYOUT

TB2



TERMINAL BLOCK LAYOUT

TB2



UL 508A LISTED

REV.	DESCRIPTION	DATE	APPR.
REVISIONS			

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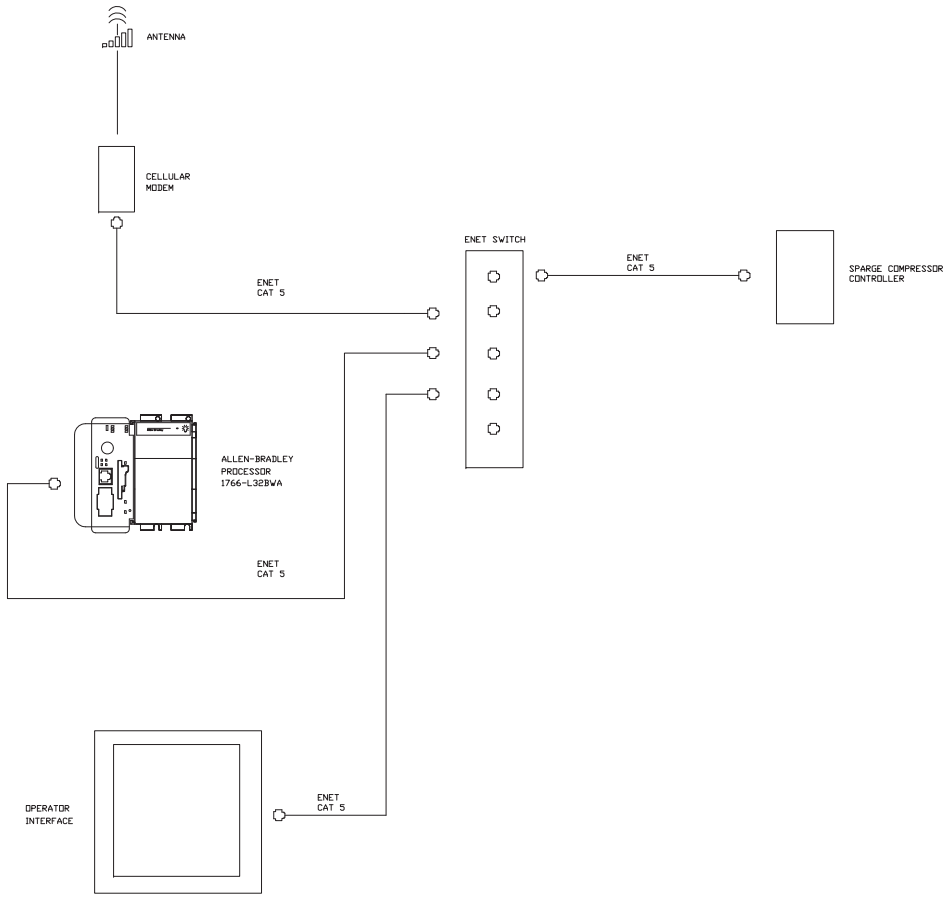
Mid-Atlantic Environmental Equipment, Inc.

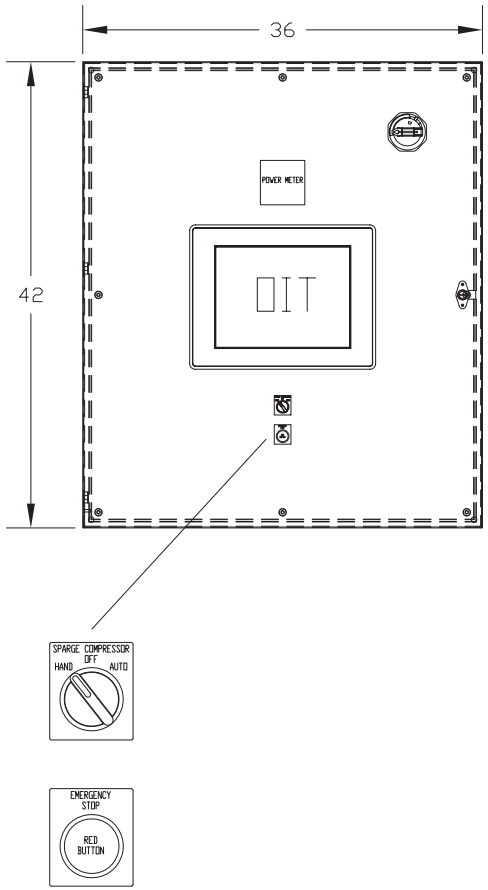
DRWN BY SDH	DATE 10/3/14
CHK BY	DATE
APPR BY	DATE

TITLE: Electrical Control Diagram

KENNEDY SPACE CENTER | JOB NO. 23041

SCALE	SIZE	DWG NO.	SHEET	REV
N/A	B	23041SHS	8 OF 9	PRELIM





UL 508A LISTED

REV.	DESCRIPTION	DATE	APPR.
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DRWN BY SDH	DATE 10/3/14	TITLE: Electrical Control Diagram	
CHK BY	DATE	KENNEDY SPACE CENTER	JOB NO. 23041
APPR BY	DATE	SCALE N/A / SIZE B / DWG NO. 23041SHS	SHEET 9 OF 9 / REV PRELIM

RSLogix 500 Project Report



Processor Information

Processor Type: Bul.1766 MicroLogix 1400 Series A

Processor Name: KNNDY_SP

Total Memory Used: 1540 Instruction Words Used - 2180 Data Table Words Used

Total Memory Left: 10894 Instruction Words Left

Program Files: 9

Data Files: 23

Program ID: 991b

I/O Configuration

0	Bul.1766	MicroLogix 1400 Series A
1	OTHER	I/O Module - ID Code = 20
2	OTHER	I/O Module - ID Code = 20
3	OTHER	I/O Module - ID Code = 20
4	OTHER	I/O Module - ID Code = 20
5		
6		
7		

Channel Configuration

CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex
 CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex Edit Resource/Owner Timeout: 60
 CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex Passthru Link ID: 1
 CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex Write Protected: No
 CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex Comms Servicing Selection: No
 CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex Message Servicing Selection: No
 CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex 1st AWA Append Character: \d
 CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex 2nd AWA Append Character: \a

 Source ID: 1 (decimal)
 Baud: 19200
 Parity: NONE
 Control Line : No Handshaking
 Error Detection: CRC
 Embedded Responses: Auto Detect
 Duplicate Packet Detect: Yes
 ACK Timeout(x20 ms): 50
 NAK Retries: 3
 ENQ Retries: 3

CHANNEL 1 (SYSTEM) - Driver: Ethernet
 CHANNEL 1 (SYSTEM) - Driver: Ethernet Edit Resource/Owner Timeout: 60
 CHANNEL 1 (SYSTEM) - Driver: Ethernet Passthru Link ID: 1
 CHANNEL 1 (SYSTEM) - Driver: Ethernet Write Protected: No
 CHANNEL 1 (SYSTEM) - Driver: Ethernet Comms Servicing Selection: Yes
 CHANNEL 1 (SYSTEM) - Driver: Ethernet Message Servicing Selection: Yes

 Hardware Address: 00:00:00:00:00:00
 IP Address: 192.168.0.100
 Subnet Mask: 255.255.255.0
 Gateway Address: 192.168.0.1
 Msg Connection Timeout (x 1mS): 15000
 Msg Reply Timeout (x mS): 3000
 Inactivity Timeout (x Min): 30
 Bootp Enable: No
 Dhcp Enable No
 SMTP Enable: No
 SNMP Enable: Yes
 HTTP Enable: Yes
 Auto Negotiate Enable: Yes
 Port Speed Enable: 10/100 Mbps Full Duplex/Half Duplex
 Contact:
 Location:

CHANNEL 2 (SYSTEM) - Driver: DF1 Full Duplex
 CHANNEL 2 (SYSTEM) - Driver: DF1 Full Duplex Edit Resource/Owner Timeout: 60
 CHANNEL 2 (SYSTEM) - Driver: DF1 Full Duplex Passthru Link ID: 1
 CHANNEL 2 (SYSTEM) - Driver: DF1 Full Duplex Write Protected: No
 CHANNEL 2 (SYSTEM) - Driver: DF1 Full Duplex Comms Servicing Selection: Yes
 CHANNEL 2 (SYSTEM) - Driver: DF1 Full Duplex Message Servicing Selection: Yes
 CHANNEL 2 (SYSTEM) - Driver: DF1 Full Duplex 1st AWA Append Character: \d
 CHANNEL 2 (SYSTEM) - Driver: DF1 Full Duplex 2nd AWA Append Character: \a

 Source ID: 1 (decimal)
 Baud: 19200
 Parity: NONE
 Control Line : No Handshaking
 Error Detection: CRC
 Embedded Responses: Auto Detect
 Duplicate Packet Detect: Yes
 ACK Timeout(x20 ms): 50
 NAK Retries: 3
 ENQ Retries: 3

Program File List

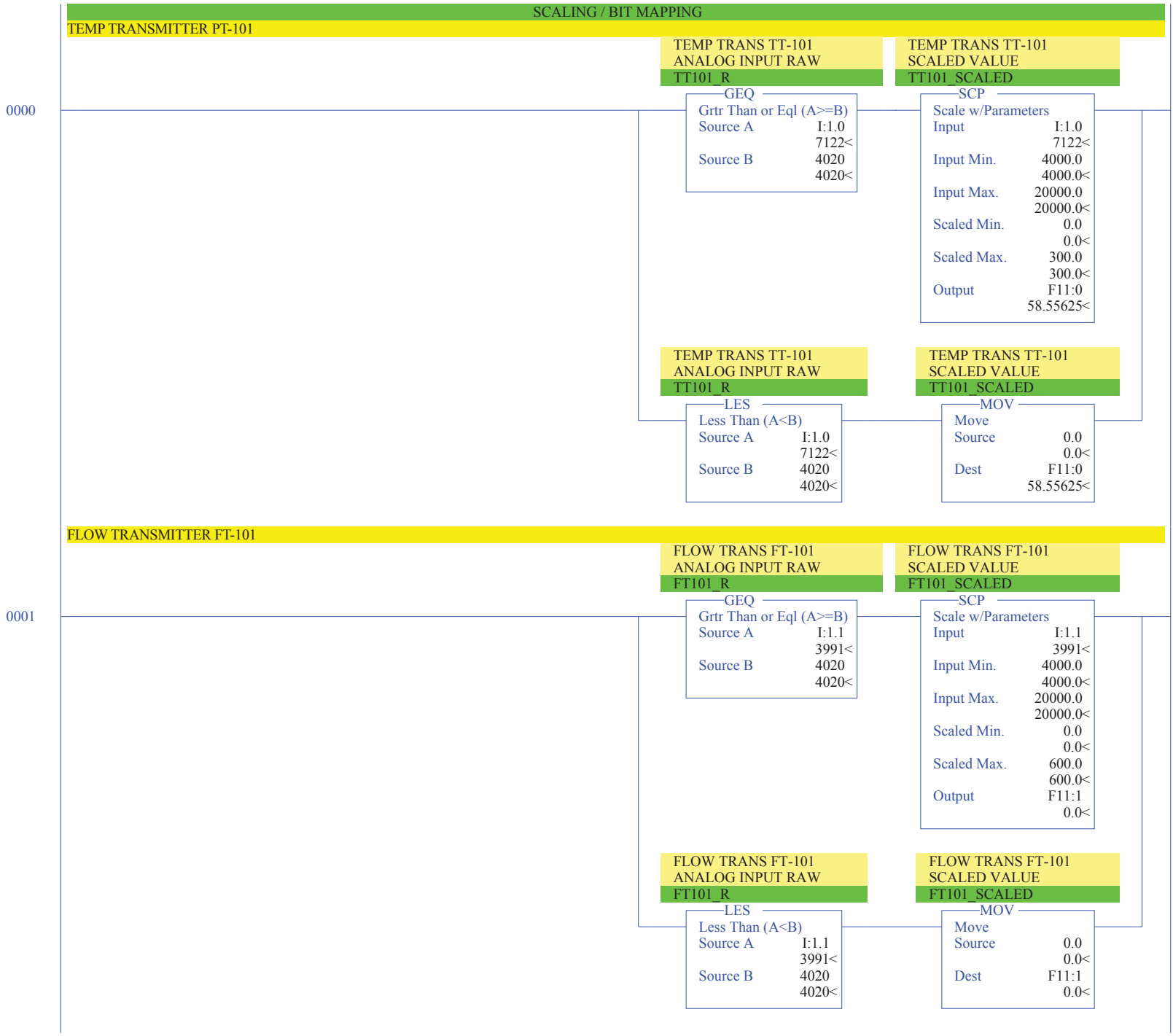
Name	Number	Type	Rungs	Debug	Bytes
[SYSTEM]	0	SYS	0	No	0
	1	SYS	0	No	0
MAIN	2	LADDER	8	No	66
SCALING	3	LADDER	38	No	2499
ALARMING	4	LADDER	89	No	2013
RUNTIMES	5	LADDER	2	No	98
CYCL_1_10	6	LADDER	21	No	2453
CYCL_11_20	7	LADDER	21	No	2453
OUTPUT	8	LADDER	13	No	2283

Data File List

Name	Number	Type	Scope	Debug	Words	Elements	Last
OUTPUT	0	O	Global	No	114	38	O:37
INPUT	1	I	Global	No	120	40	I:39
RTU_101	2	S	Global	No	0	66	S:65
BINARY	3	B	Global	No	1	1	B3:0
TIMER	4	T	Global	No	63	21	T4:20
COUNTER	5	C	Global	No	30	10	C5:9
CONTROL	6	R	Global	No	3	1	R6:0
INTEGER	7	N	Global	No	20	20	N7:19
FLT_SPT	8	F	Global	No	120	60	F8:59
INT_SPT	9	N	Global	No	109	109	N9:108
INT_DISP	10	N	Global	No	60	60	N10:59
FLT_DISP	11	F	Global	No	180	90	F11:89
BIT_DISP	12	B	Global	No	25	25	B12:24
BIT_CTRL	13	B	Global	No	35	35	B13:34
I_BITS	14	B	Global	No	10	10	B14:9
I_INT	15	N	Global	No	100	100	N15:99
I_FLTS	16	F	Global	No	80	40	F16:39
PID_CTRL_1	17	N	Global	No	250	250	N17:249
ALA_TMRS	18	T	Global	No	120	40	T18:39
CTRL_TMRS	19	T	Global	No	180	60	T19:59
REM_OUT	20	N	Global	No	40	40	N20:39
REM_IN	21	N	Global	No	60	60	N21:59
PID_CTRL_W	22	PD	Global	No	460	20	PD22:19

LAD 2 - MAIN --- Total Rungs in File = 8




SCALING / BIT MAPPING
TEMP TRANSMITTER PT-101
TEMP TRANS TT-101
ANALOG INPUT RAW
TT101_R
TEMP TRANS TT-101
SCALED VALUE
TT101_SCALED
0000
GEQ
Grtr Than or Eql (A>=B)
Source A I:1.0
7122<
Source B 4020
4020<
SCP
Scale w/Parameters
Input I:1.0
7122<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 300.0
300.0<
Output F11:0
58.55625<
TEMP TRANS TT-101
ANALOG INPUT RAW
TT101_R
TEMP TRANS TT-101
SCALED VALUE
TT101_SCALED
LES
Less Than (A<B)
Source A I:1.0
7122<
Source B 4020
4020<
MOV
Move
Source 0.0
0.0<
Dest F11:0
58.55625<
FLOW TRANSMITTER FT-101
FLOW TRANS FT-101
ANALOG INPUT RAW
FT101_R
FLOW TRANS FT-101
SCALED VALUE
FT101_SCALED
0001
GEQ
Grtr Than or Eql (A>=B)
Source A I:1.1
3991<
Source B 4020
4020<
SCP
Scale w/Parameters
Input I:1.1
3991<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 600.0
600.0<
Output F11:1
0.0<
FLOW TRANS FT-101
ANALOG INPUT RAW
FT101_R
FLOW TRANS FT-101
SCALED VALUE
FT101_SCALED
LES
Less Than (A<B)
Source A I:1.1
3991<
Source B 4020
4020<
MOV
Move
Source 0.0
0.0<
Dest F11:1
0.0<

TEMP TRANSMITTER TT-103

0002

TEMP TRANS TT-103
ANALOG INPUT RAW
TT103_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:1.2
6726<
Source B 4020
4020<

TEMP TRANS TT-103
SCALED VALUE
TT103_SCALED

SCP
Scale w/Parameters
Input I:1.2
6726<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 300.0
300.0<
Output F11:2
51.16875<

TEMP TRANS TT-103
ANALOG INPUT RAW
TT103_R

LES
Less Than (A<B)
Source A I:1.2
6726<
Source B 4020
4020<

TEMP TRANS TT-103
SCALED VALUE
TT103_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:2
51.16875<

PRESS TRANSMITTER PT-101

0003

PRESS TRANS PT-101
ANALOG INPUT RAW
PT101_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:1.3
11759<
Source B 4020
4020<

PRESS TRANS PT-101
SCALED VALUE
PT101_SCALED

SCP
Scale w/Parameters
Input I:1.3
11759<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 200.0
200.0<
Output F11:3
96.875<

PRESS TRANS PT-101
ANALOG INPUT RAW
PT101_R

LES
Less Than (A<B)
Source A I:1.3
11759<
Source B 4020
4020<

PRESS TRANS PT-101
SCALED VALUE
PT101_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:3
96.875<

TEMP TRANSMITTER TT-102

0004

TEMP TRANS TT-102
ANALOG INPUT RAW
TT102_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:1.4
6986<
Source B 4020
4020<

TEMP TRANS TT-102
SCALED VALUE
TT102_SCALED

SCP
Scale w/Parameters
Input I:1.4
6986<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 300.0
300.0<
Output F11:4
56.04375<

TEMP TRANS TT-102
ANALOG INPUT RAW
TT102_R

LES
Less Than (A<B)
Source A I:1.4
6986<
Source B 4020
4020<

TEMP TRANS TT-102
SCALED VALUE
TT102_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:4
56.04375<

PRESS TRANSMITTER PT-102

0005

PRESS TRANS PT-102
ANALOG INPUT RAW
PT102_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:1.5
3905<
Source B 4020
4020<

PRESS TRANS PT-102
SCALED VALUE
PT102_SCALED

SCP
Scale w/Parameters
Input I:1.5
3905<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 100.0
100.0<
Output F11:5
0.0<

PRESS TRANS PT-102
ANALOG INPUT RAW
PT102_R

LES
Less Than (A<B)
Source A I:1.5
3905<
Source B 4020
4020<

PRESS TRANS PT-102
SCALED VALUE
PT102_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:5
0.0<

FLOW TRANSMITTER FT-102

0006

FLOW TRANS FT-102 ANALOG INPUT RAW
FT102_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:1.6 3980<
Source B 4020 4020<

FLOW TRANS FT-102 SCALED VALUE
FT102_SCALED

SCP
Scale w/Parameters
Input I:1.6 3980<
Input Min. 4000.0 4000.0<
Input Max. 20000.0 20000.0<
Scaled Min. 0.0 0.0<
Scaled Max. 600.0 600.0<
Output F11:6 0.0<

FLOW TRANS FT-102 ANALOG INPUT RAW
FT102_R

LES
Less Than (A<B)
Source A I:1.6 3980<
Source B 4020 4020<

FLOW TRANS FT-102 SCALED VALUE
FT102_SCALED

MOV
Move
Source 0.0 0.0<
Dest F11:6 0.0<

RH TRANSMITTER RHT-101

0007

REL HUMIDITY TRANS RHT-101 ANALOG INPUT RAW
RHT101_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:1.7 17040<
Source B 4020 4020<

REL HUMIDITY TRANS RHT-101 SCALED VALUE
RHT101_SCALED

SCP
Scale w/Parameters
Input I:1.7 17040<
Input Min. 4000.0 4000.0<
Input Max. 20000.0 20000.0<
Scaled Min. 0.0 0.0<
Scaled Max. 100.0 100.0<
Output F11:7 81.5<

REL HUMIDITY TRANS RHT-101 ANALOG INPUT RAW
RHT101_R

LES
Less Than (A<B)
Source A I:1.7 17040<
Source B 4020 4020<

REL HUMIDITY TRANS RHT-101 SCALED VALUE
RHT101_SCALED

MOV
Move
Source 0.0 0.0<
Dest F11:7 81.5<

PRESS TRANSMITTER PT-103

0008

PRESS TRANS PT-103
ANALOG INPUT RAW
PT103_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:2.0
3940<
Source B 4020
4020<

PRESS TRANS PT-103
SCALED VALUE
PT103_SCALED

SCP
Scale w/Parameters
Input I:2.0
3940<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 100.0
100.0<
Output F11:8
0.0<

PRESS TRANS PT-103
ANALOG INPUT RAW
PT103_R

LES
Less Than (A<B)
Source A I:2.0
3940<
Source B 4020
4020<

PRESS TRANS PT-103
SCALED VALUE
PT103_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:8
0.0<

FLOW TRANSMITTER PT-103

0009

FLOW TRANS FT-103
ANALOG INPUT RAW
FT103_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:2.1
3972<
Source B 4020
4020<

FLOW TRANS FT-103
SCALED VALUE
FT103_SCALED

SCP
Scale w/Parameters
Input I:2.1
3972<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 600.0
600.0<
Output F11:9
0.0<

FLOW TRANS FT-103
ANALOG INPUT RAW
FT103_R

LES
Less Than (A<B)
Source A I:2.1
3972<
Source B 4020
4020<

FLOW TRANS FT-103
SCALED VALUE
FT103_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:9
0.0<

PRESS TRANSMITTER PT-104

0010

PRESS TRANS PT-104
ANALOG INPUT RAW
PT104_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:2.2
3998<
Source B 4020
4020<

PRESS TRANS PT-104
SCALED VALUE
PT104_SCALED

SCP
Scale w/Parameters
Input I:2.2
3998<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 100.0
100.0<
Output F11:10
0.0<

PRESS TRANS PT-104
ANALOG INPUT RAW
PT104_R

LES
Less Than (A<B)
Source A I:2.2
3998<
Source B 4020
4020<

PRESS TRANS PT-104
SCALED VALUE
PT104_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:10
0.0<

FLOW TRANSMITTER FT-104

0011

FLOW TRANS FT-104
ANALOG INPUT RAW
FT104_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:2.3
3991<
Source B 4020
4020<

FLOW TRANS FT-104
SCALED VALUE
FT104_SCALED

SCP
Scale w/Parameters
Input I:2.3
3991<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 600.0
600.0<
Output F11:11
0.0<

FLOW TRANS FT-104
ANALOG INPUT RAW
FT104_R

LES
Less Than (A<B)
Source A I:2.3
3991<
Source B 4020
4020<

FLOW TRANS FT-104
SCALED VALUE
FT104_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:11
0.0<

PRESS TRANSMITTER PT-105

0012

PRESS TRANS PT-105
ANALOG INPUT RAW
PT105_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:2.4
3993<
Source B 4020
4020<

PRESS TRANS PT-105
SCALED VALUE
PT105_SCALED

SCP
Scale w/Parameters
Input I:2.4
3993<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 100.0
100.0<
Output F11:12
0.0<

PRESS TRANS PT-105
ANALOG INPUT RAW
PT105_R

LES
Less Than (A<B)
Source A I:2.4
3993<
Source B 4020
4020<

PRESS TRANS PT-105
SCALED VALUE
PT105_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:12
0.0<

FLOW TRANSMITTER FT-105

0013

FLOW TRANS FT-105
ANALOG INPUT RAW
FT105_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:2.5
3994<
Source B 4020
4020<

FLOW TRANS FT-105
SCALED VALUE
FT105_SCALED

SCP
Scale w/Parameters
Input I:2.5
3994<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 600.0
600.0<
Output F11:13
0.0<

FLOW TRANS FT-105
ANALOG INPUT RAW
FT105_R

LES
Less Than (A<B)
Source A I:2.5
3994<
Source B 4020
4020<

FLOW TRANS FT-105
SCALED VALUE
FT105_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:13
0.0<

PRESS TRANSMITTER PT-106

0014

PRESS TRANS PT-106
ANALOG INPUT RAW
PT106_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:2.6
3978<
Source B 4020
4020<

PRESS TRANS PT-106
SCALED VALUE
PT106_SCALED

SCP
Scale w/Parameters
Input I:2.6
3978<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 100.0
100.0<
Output F11:14
0.0<

PRESS TRANS PT-106
ANALOG INPUT RAW
PT106_R

LES
Less Than (A<B)
Source A I:2.6
3978<
Source B 4020
4020<

PRESS TRANS PT-106
SCALED VALUE
PT106_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:14
0.0<

FLOW TRANSMITTER FT-106

0015

FLOW TRANS FT-106
ANALOG INPUT RAW
FT106_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:2.7
3979<
Source B 4020
4020<

FLOW TRANS FT-106
SCALED VALUE
FT106_SCALED

SCP
Scale w/Parameters
Input I:2.7
3979<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 600.0
600.0<
Output F11:15
0.0<

FLOW TRANS FT-106
ANALOG INPUT RAW
FT106_R

LES
Less Than (A<B)
Source A I:2.7
3979<
Source B 4020
4020<

FLOW TRANS FT-106
SCALED VALUE
FT106_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:15
0.0<

PRESS TRANSMITTER PT-107

0016

PRESS TRANS PT-107
ANALOG INPUT RAW
PT107_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:3.0
3925<
Source B 4020
4020<

PRESS TRANS PT-107
SCALED VALUE
PT107_SCALED

SCP
Scale w/Parameters
Input I:3.0
3925<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 100.0
100.0<
Output F11:16
0.0<

PRESS TRANS PT-107
ANALOG INPUT RAW
PT107_R

LES
Less Than (A<B)
Source A I:3.0
3925<
Source B 4020
4020<

PRESS TRANS PT-107
SCALED VALUE
PT107_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:16
0.0<

FLOW TRANSMITTER FT-107

0017

FLOW TRANS FT-107
ANALOG INPUT RAW
FT107_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:3.1
3979<
Source B 4020
4020<

FLOW TRANS FT-107
SCALED VALUE
FT107_SCALED

SCP
Scale w/Parameters
Input I:3.1
3979<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 600.0
600.0<
Output F11:17
0.0<

FLOW TRANS FT-107
ANALOG INPUT RAW
FT107_R

LES
Less Than (A<B)
Source A I:3.1
3979<
Source B 4020
4020<

FLOW TRANS FT-107
SCALED VALUE
FT107_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:17
0.0<

PRESS TRANSMITTER PT-108

0018

PRESS TRANS PT-108
ANALOG INPUT RAW
PT108_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:3.2
3963<
Source B 4020
4020<

PRESS TRANS PT-108
SCALED VALUE
PT108_SCALED

SCP
Scale w/Parameters
Input I:3.2
3963<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 100.0
100.0<
Output F11:18
0.0<

PRESS TRANS PT-108
ANALOG INPUT RAW
PT108_R

LES
Less Than (A<B)
Source A I:3.2
3963<
Source B 4020
4020<

PRESS TRANS PT-108
SCALED VALUE
PT108_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:18
0.0<

FLOW TRANSMITTER FT-108

0019

FLOW TRANS FT-108
ANALOG INPUT RAW
FT108_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:3.3
3962<
Source B 4020
4020<

FLOW TRANS FT-108
SCALED VALUE
FT108_SCALED

SCP
Scale w/Parameters
Input I:3.3
3962<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 600.0
600.0<
Output F11:19
0.0<

FLOW TRANS FT-108
ANALOG INPUT RAW
FT108_R

LES
Less Than (A<B)
Source A I:3.3
3962<
Source B 4020
4020<

FLOW TRANS FT-108
SCALED VALUE
FT108_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:19
0.0<

PRESS TRANSMITTER PT-109

0020

PRESS TRANS PT-109
ANALOG INPUT RAW
PT109_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:3.4
3968<
Source B 4020
4020<

PRESS TRANS PT-109
SCALED VALUE
PT109_SCALED

SCP
Scale w/Parameters
Input I:3.4
3968<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 100.0
100.0<
Output F11:20
0.0<

PRESS TRANS PT-109
ANALOG INPUT RAW
PT109_R

LES
Less Than (A<B)
Source A I:3.4
3968<
Source B 4020
4020<

PRESS TRANS PT-109
SCALED VALUE
PT109_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:20
0.0<

FLOW TRANSMITTER FT-109

0021

FLOW TRANS FT-109
ANALOG INPUT RAW
FT109_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:3.5
4000<
Source B 4020
4020<

FLOW TRANS FT-109
SCALED VALUE
FT109_SCALED

SCP
Scale w/Parameters
Input I:3.5
4000<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 600.0
600.0<
Output F11:21
0.0<

FLOW TRANS FT-109
ANALOG INPUT RAW
FT109_R

LES
Less Than (A<B)
Source A I:3.5
4000<
Source B 4020
4020<

FLOW TRANS FT-109
SCALED VALUE
FT109_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:21
0.0<

PRESS TRANSMITTER PT-110

0022

PRESS TRANS PT-110
ANALOG INPUT RAW
PT110_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:3.6
3942<
Source B 4020
4020<

PRESS TRANS PT-110
SCALED VALUE
PT110_SCALED

SCP
Scale w/Parameters
Input I:3.6
3942<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 100.0
100.0<
Output F11:22
0.0<

PRESS TRANS PT-110
ANALOG INPUT RAW
PT110_R

LES
Less Than (A<B)
Source A I:3.6
3942<
Source B 4020
4020<

PRESS TRANS PT-110
SCALED VALUE
PT110_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:22
0.0<

FLOW TRANSMITTER FT-110

0023

FLOW TRANS FT-110
ANALOG INPUT RAW
FT110_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:3.7
3989<
Source B 4020
4020<

FLOW TRANS FT-110
SCALED VALUE
FT110_SCALED

SCP
Scale w/Parameters
Input I:3.7
3989<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 600.0
600.0<
Output F11:23
0.0<

FLOW TRANS FT-110
ANALOG INPUT RAW
FT110_R

LES
Less Than (A<B)
Source A I:3.7
3989<
Source B 4020
4020<

FLOW TRANS FT-110
SCALED VALUE
FT110_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:23
0.0<

PRESS TRANSMITTER PT-111

0024

PRESS TRANS PT-111
ANALOG INPUT RAW
PT111_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:4.0
3984<
Source B 4020
4020<

PRESS TRANS PT-111
SCALED VALUE
PT111_SCALED

SCP
Scale w/Parameters
Input I:4.0
3984<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 100.0
100.0<
Output F11:24
0.0<

PRESS TRANS PT-111
ANALOG INPUT RAW
PT111_R

LES
Less Than (A<B)
Source A I:4.0
3984<
Source B 4020
4020<

PRESS TRANS PT-111
SCALED VALUE
PT111_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:24
0.0<

FLOW TRANSMITTER FT-111

0025

FLOW TRANS FT-111
ANALOG INPUT RAW
FT111_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:4.1
3985<
Source B 4020
4020<

FLOW TRANS FT-111
SCALED VALUE
FT111_SCALED

SCP
Scale w/Parameters
Input I:4.1
3985<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 600.0
600.0<
Output F11:25
0.0<

FLOW TRANS FT-111
ANALOG INPUT RAW
FT111_R

LES
Less Than (A<B)
Source A I:4.1
3985<
Source B 4020
4020<

FLOW TRANS FT-111
SCALED VALUE
FT111_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:25
0.0<

PRESS TRANSMITTER PT-112

0026

PRESS TRANS PT-112
ANALOG INPUT RAW
PT112_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:4.2
3941<
Source B 4020
4020<

PRESS TRANS PT-112
SCALED VALUE
PT112_SCALED

SCP
Scale w/Parameters
Input I:4.2
3941<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 100.0
100.0<
Output F11:26
0.0<

PRESS TRANS PT-112
ANALOG INPUT RAW
PT112_R

LES
Less Than (A<B)
Source A I:4.2
3941<
Source B 4020
4020<

PRESS TRANS PT-112
SCALED VALUE
PT112_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:26
0.0<

FLOW TRANSMITTER FT-112

0027

FLOW TRANS FT-112
ANALOG INPUT RAW
FT112_R

GEQ
Grtr Than or Eql (A>=B)
Source A I:4.3
3986<
Source B 4020
4020<

FLOW TRANS FT-112
SCALED VALUE
FT112_SCALED

SCP
Scale w/Parameters
Input I:4.3
3986<
Input Min. 4000.0
4000.0<
Input Max. 20000.0
20000.0<
Scaled Min. 0.0
0.0<
Scaled Max. 600.0
600.0<
Output F11:27
0.0<

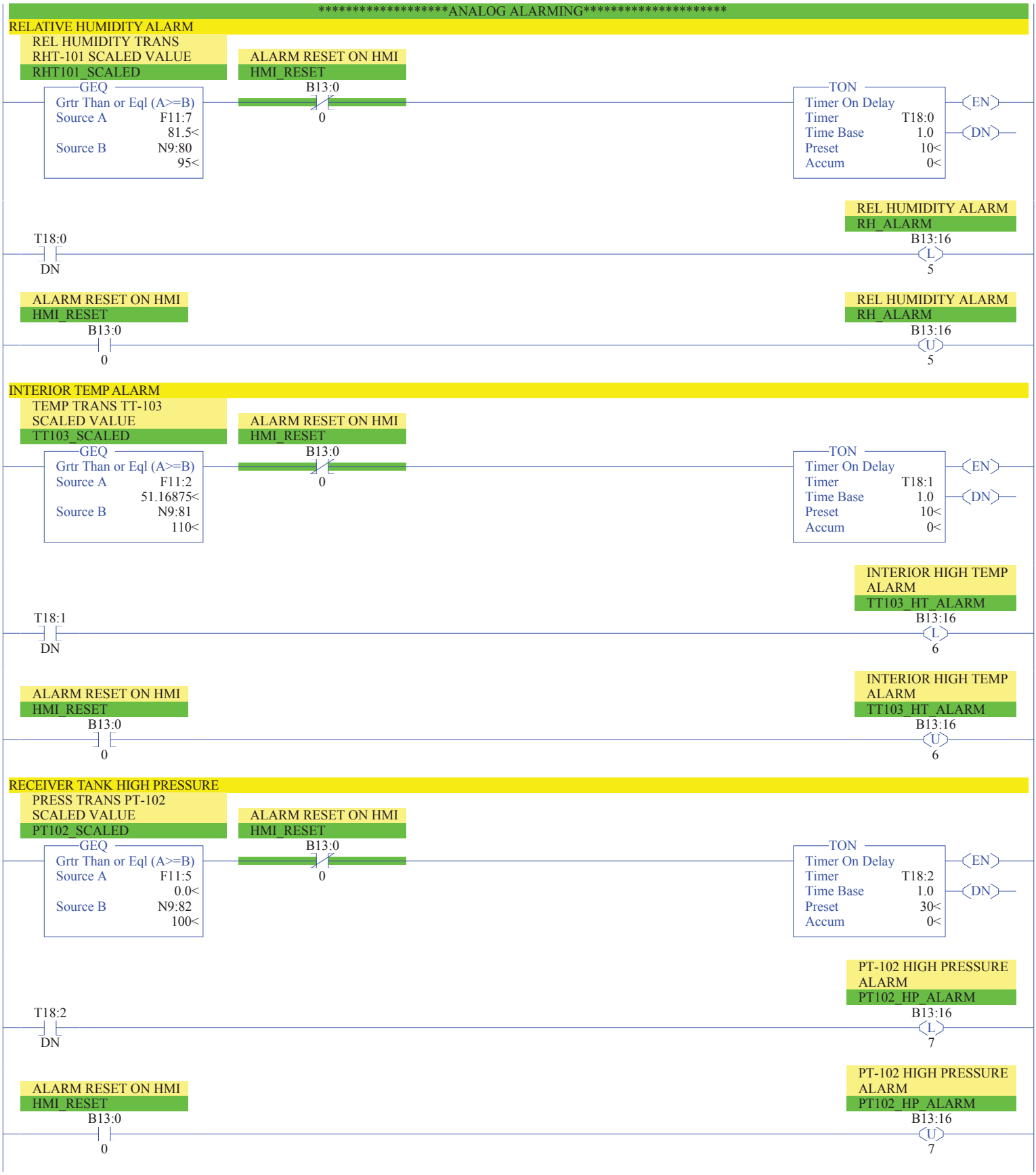
FLOW TRANS FT-112
ANALOG INPUT RAW
FT112_R

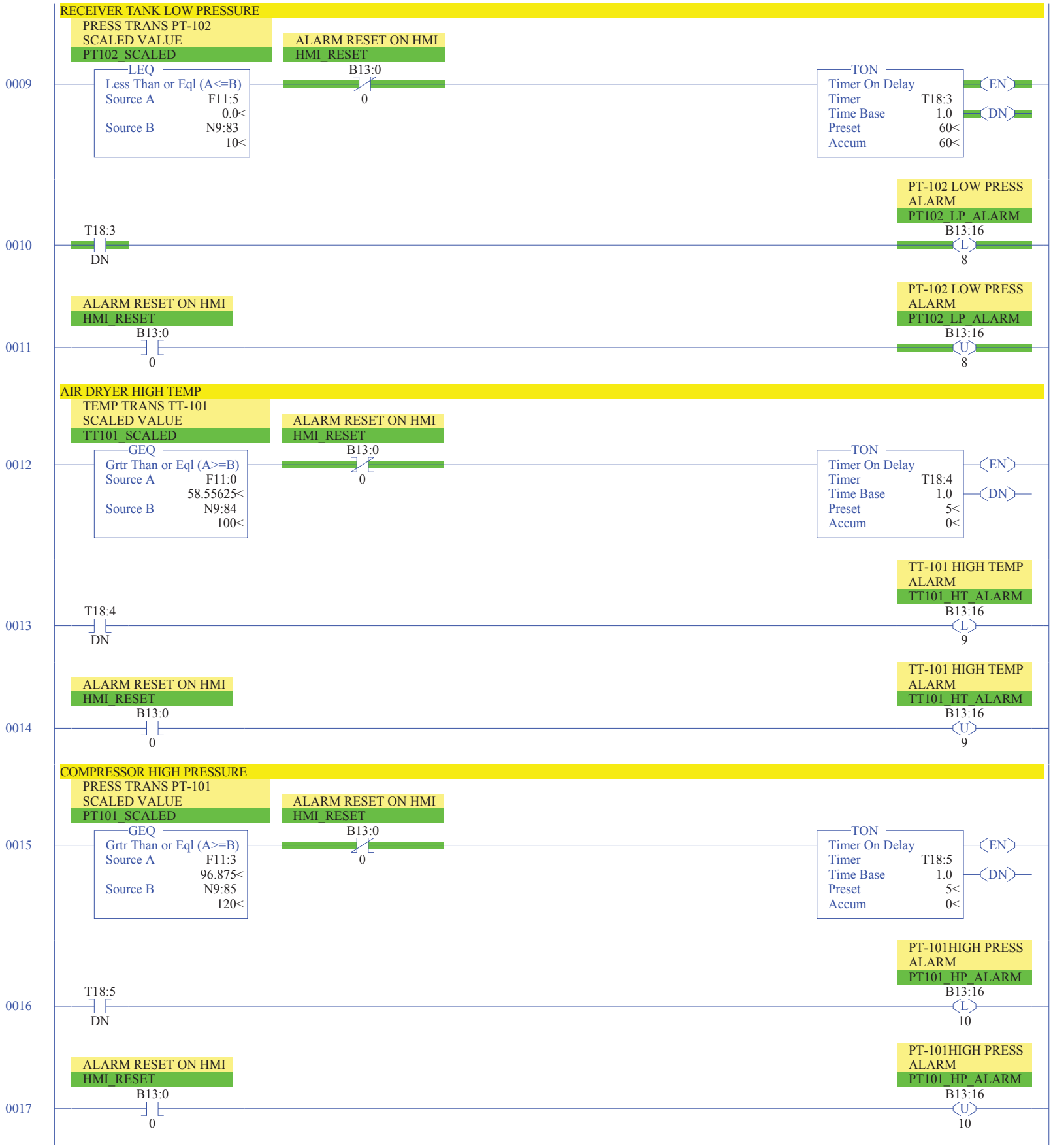
LES
Less Than (A<B)
Source A I:4.3
3986<
Source B 4020
4020<

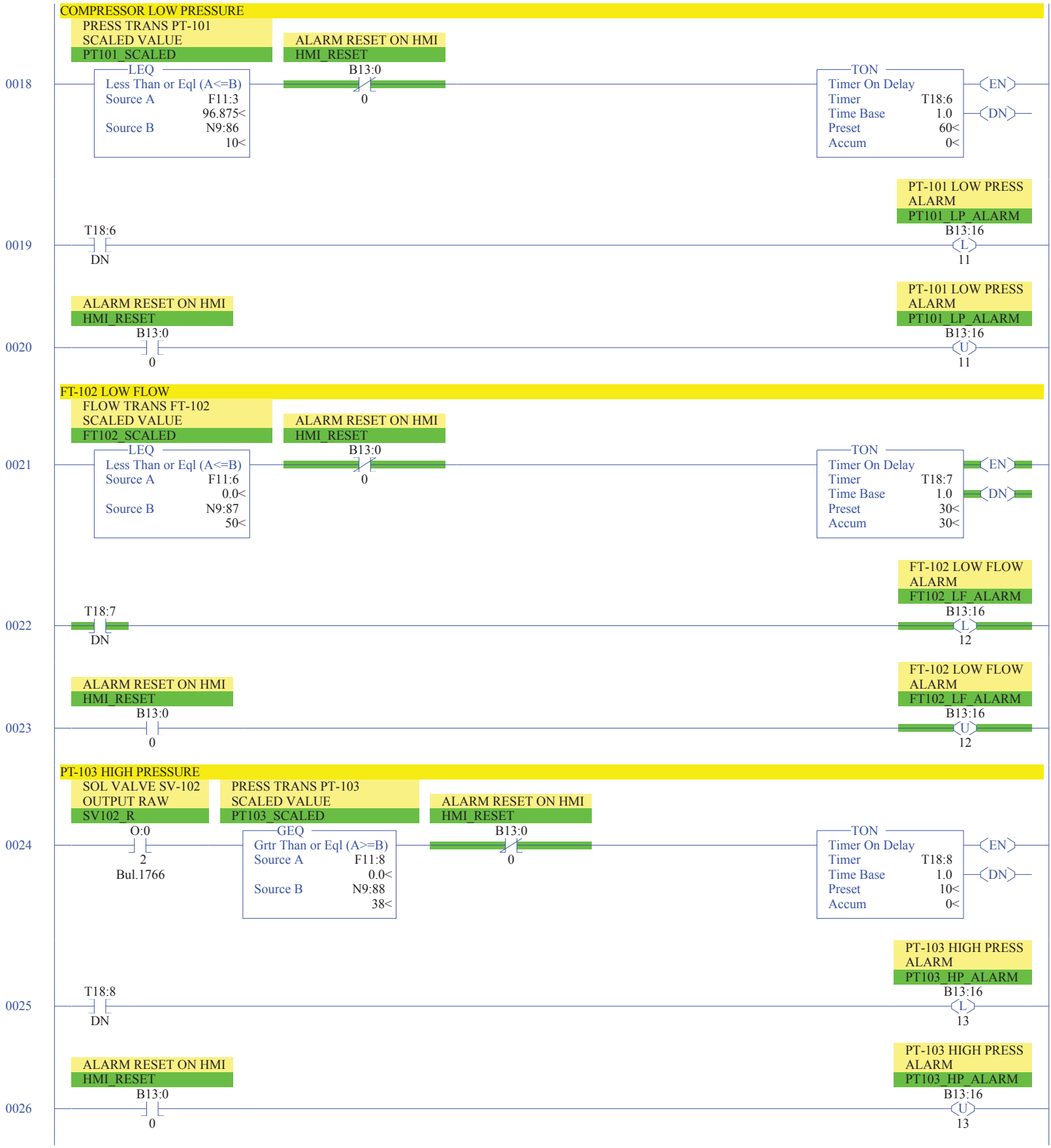
FLOW TRANS FT-112
SCALED VALUE
FT112_SCALED

MOV
Move
Source 0.0
0.0<
Dest F11:27
0.0<


BIT MAPPINGS
ESTOP
ESTOP INPUT RAW
ESTOP_R
I:0
0
Bul.1766
ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
L
0
0028
ALARM RESET ON HMI
HMI_RESET
B13:0
0
ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
U
0
0029
PHASE MONITOR ALARM
PHASE MONITOR INPUT RAW
PHAMON_R
I:0
1
Bul.1766
PHASE MONITOR ALARM
YI_PHAMON_ALARM
B12:0
L
1
0030
PHASE MONITOR ALARM
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PHASE MONITOR ALARM
YI_PHAMON_ALARM
B12:0
U
1
0031
CONDENSATE HIGH HIGH
CONDENSATE SEPARATOR HI HI INPUT RAW
COND_SEP_HH_R
I:0
2
Bul.1766
CONDENSATE SEP HI HI ALARM
COND_SEP_HH_ALARM
B12:0
L
2
0032
CONDENSATE HIGH HIGH
ALARM RESET ON HMI
HMI_RESET
B13:0
0
CONDENSATE SEP HI HI ALARM
COND_SEP_HH_ALARM
B12:0
U
2
0033
AIR SPARGE COMP RUN STATUS
AIR COMPRESSOR RUN STATUS INPUT RAW
AS_COMP_STATUR_R
I:0
3
Bul.1766
AIR SPARGE COMPRESSOR RUN STATUS
AS_COMP_RUNNING
B12:0
3
0034
AIR SPARGE COMP ALARM STATUS
AIR SPARGE WARNING SIGNAL INPUT RAW
AS_WARN_SIGNAL_R
I:0
5
Bul.1766
AIR SPARGE COMPRESSOR WARNING STATUS
AIR_COMP_WARN_STATUS
B12:0
5
0035
AIR SPARGE ALARM INDICATION INPUT RAW
AS_ALARM_R
I:0
6
Bul.1766
AIR SPARGE COMPRESSOR ALARM STATUS
AIR_COMP_ALRM_STATUS
B12:0
6
0036
END
0037


**********ANALOG ALARMING**********
RELATIVE HUMIDITY ALARM
REL HUMIDITY TRANS
RHT-101 SCALED VALUE
RHT101_SCALED
ALARM RESET ON HMI
HMI_RESET
B13:0
0000
GEQ
Grtr Than or Eql (A>=B)
Source A F11:7
81.5<
Source B N9:80
95<
0
TON
Timer On Delay
Timer T18:0
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
REL HUMIDITY ALARM
RH_ALARM
B13:16
T18:0
DN
0001
L
5
ALARM RESET ON HMI
HMI_RESET
B13:0
0002
0
REL HUMIDITY ALARM
RH_ALARM
B13:16
U
5
INTERIOR TEMP ALARM
TEMP TRANS TT-103
SCALED VALUE
TT103_SCALED
ALARM RESET ON HMI
HMI_RESET
B13:0
0003
GEQ
Grtr Than or Eql (A>=B)
Source A F11:2
51.16875<
Source B N9:81
110<
0
TON
Timer On Delay
Timer T18:1
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
INTERIOR HIGH TEMP
ALARM
TT103_HT_ALARM
B13:16
T18:1
DN
0004
L
6
ALARM RESET ON HMI
HMI_RESET
B13:0
0005
0
INTERIOR HIGH TEMP
ALARM
TT103_HT_ALARM
B13:16
U
6
RECEIVER TANK HIGH PRESSURE
PRESS TRANS PT-102
SCALED VALUE
PT102_SCALED
ALARM RESET ON HMI
HMI_RESET
B13:0
0006
GEQ
Grtr Than or Eql (A>=B)
Source A F11:5
0.0<
Source B N9:82
100<
0
TON
Timer On Delay
Timer T18:2
Time Base 1.0
Preset 30<
Accum 0<
EN
DN
PT-102 HIGH PRESSURE
ALARM
PT102_HP_ALARM
B13:16
T18:2
DN
0007
L
7
ALARM RESET ON HMI
HMI_RESET
B13:0
0008
0
PT-102 HIGH PRESSURE
ALARM
PT102_HP_ALARM
B13:16
U
7


RECEIVER TANK LOW PRESSURE
PRESS TRANS PT-102 SCALED VALUE
PT102_SCALED
ALARM RESET ON HMI
HMI_RESET
B13:0
0
LEQ
Less Than or Eql (A<=B)
Source A F11:5 0.0<
Source B N9:83 10<
TON
Timer On Delay
Timer T18:3
Time Base 1.0
Preset 60<
Accum 60<
EN
DN
0009
PT-102 LOW PRESS ALARM
PT102_LP_ALARM
B13:16
L
8
T18:3
DN
0010
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-102 LOW PRESS ALARM
PT102_LP_ALARM
B13:16
U
8
0011
AIR DRYER HIGH TEMP
TEMP TRANS TT-101 SCALED VALUE
TT101_SCALED
ALARM RESET ON HMI
HMI_RESET
B13:0
0
GEQ
Grtr Than or Eql (A>=B)
Source A F11:0 58.55625<
Source B N9:84 100<
TON
Timer On Delay
Timer T18:4
Time Base 1.0
Preset 5<
Accum 0<
EN
DN
0012
TT-101 HIGH TEMP ALARM
TT101_HT_ALARM
B13:16
L
9
T18:4
DN
0013
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TT-101 HIGH TEMP ALARM
TT101_HT_ALARM
B13:16
U
9
0014
COMPRESSOR HIGH PRESSURE
PRESS TRANS PT-101 SCALED VALUE
PT101_SCALED
ALARM RESET ON HMI
HMI_RESET
B13:0
0
GEQ
Grtr Than or Eql (A>=B)
Source A F11:3 96.875<
Source B N9:85 120<
TON
Timer On Delay
Timer T18:5
Time Base 1.0
Preset 5<
Accum 0<
EN
DN
0015
PT-101HIGH PRESS ALARM
PT101_HP_ALARM
B13:16
L
10
T18:5
DN
0016
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-101HIGH PRESS ALARM
PT101_HP_ALARM
B13:16
U
10
0017


COMPRESSOR LOW PRESSURE
PRESS TRANS PT-101
SCALED VALUE
PT101_SCALED
LEQ
Less Than or Eql (A<=B)
Source A F11:3 96.875<
Source B N9:86 10<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:6
Time Base 1.0
Preset 60<
Accum 0<
EN
DN
0018
PT-101 LOW PRESS ALARM
PT101_LP_ALARM
B13:16
T18:6
DN
L
11
0019
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-101 LOW PRESS ALARM
PT101_LP_ALARM
B13:16
U
11
0020
FT-102 LOW FLOW
FLOW TRANS FT-102
SCALED VALUE
FT102_SCALED
LEQ
Less Than or Eql (A<=B)
Source A F11:6 0.0<
Source B N9:87 50<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:7
Time Base 1.0
Preset 30<
Accum 30<
EN
DN
0021
FT-102 LOW FLOW ALARM
FT102_LF_ALARM
B13:16
T18:7
DN
L
12
0022
ALARM RESET ON HMI
HMI_RESET
B13:0
0
FT-102 LOW FLOW ALARM
FT102_LF_ALARM
B13:16
U
12
0023
PT-103 HIGH PRESSURE
SOL VALVE SV-102
OUTPUT RAW
SV102_R
O:0
2
Bul.1766
PRESS TRANS PT-103
SCALED VALUE
PT103_SCALED
GEQ
Grtr Than or Eql (A>=B)
Source A F11:8 0.0<
Source B N9:88 38<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:8
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
0024
PT-103 HIGH PRESS ALARM
PT103_HP_ALARM
B13:16
T18:8
DN
L
13
0025
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-103 HIGH PRESS ALARM
PT103_HP_ALARM
B13:16
U
13
0026

PT-103 LOW PRESSURE

0027
SOL VALVE SV-102 OUTPUT RAW
SV102_R
O:0
2
Bul.1766
PRESS TRANS PT-103 SCALED VALUE
PT103_SCALED
LEQ
Less Than or Eql (A<=B)
Source A F11:8 0.0<
Source B N9:89 0<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:28
Time Base 1.0
Preset 10<
Accum 0<
EN
DN

0028
T18:28
DN
PT-103 LOW PRESS ALARM
PT103_LP_ALARM
B13:16
L
14

0029
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-103 LOW PRESS ALARM
PT103_LP_ALARM
B13:16
U
14

PT-104 HIGH PRESSURE

0030
SOL VALVE SV-103 OUTPUT RAW
SV103_R
O:0
3
Bul.1766
PRESS TRANS PT-104 SCALED VALUE
PT104_SCALED
GEQ
Grtr Than or Eql (A>=B)
Source A F11:10 0.0<
Source B N9:90 38<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:9
Time Base 1.0
Preset 10<
Accum 0<
EN
DN

0031
T18:9
DN
PT-104 HIGH PRESS ALARM
PT104_HP_ALARM
B13:16
L
15

0032
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-104 HIGH PRESS ALARM
PT104_HP_ALARM
B13:16
U
15

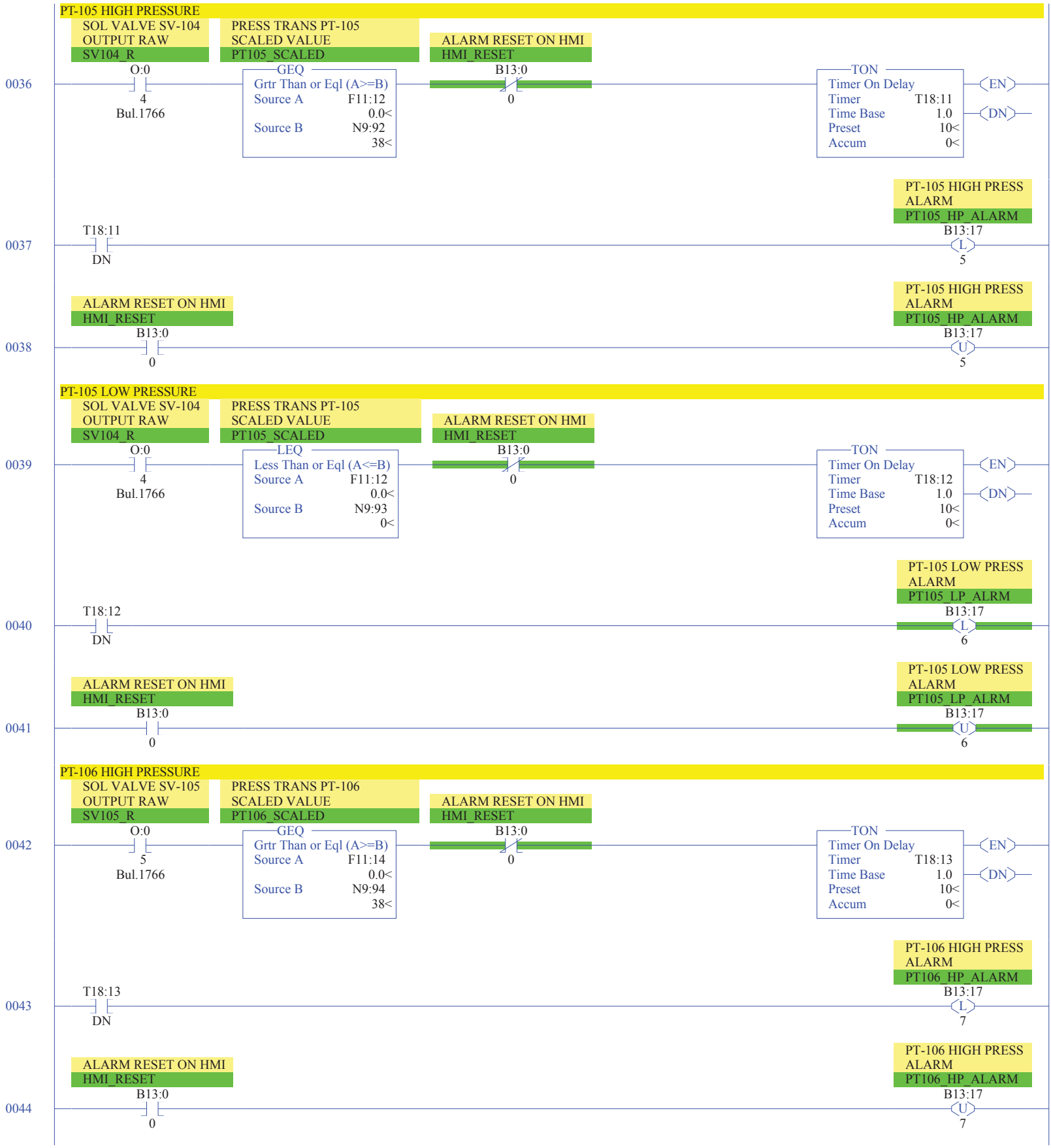
PT-104 LOW PRESSURE

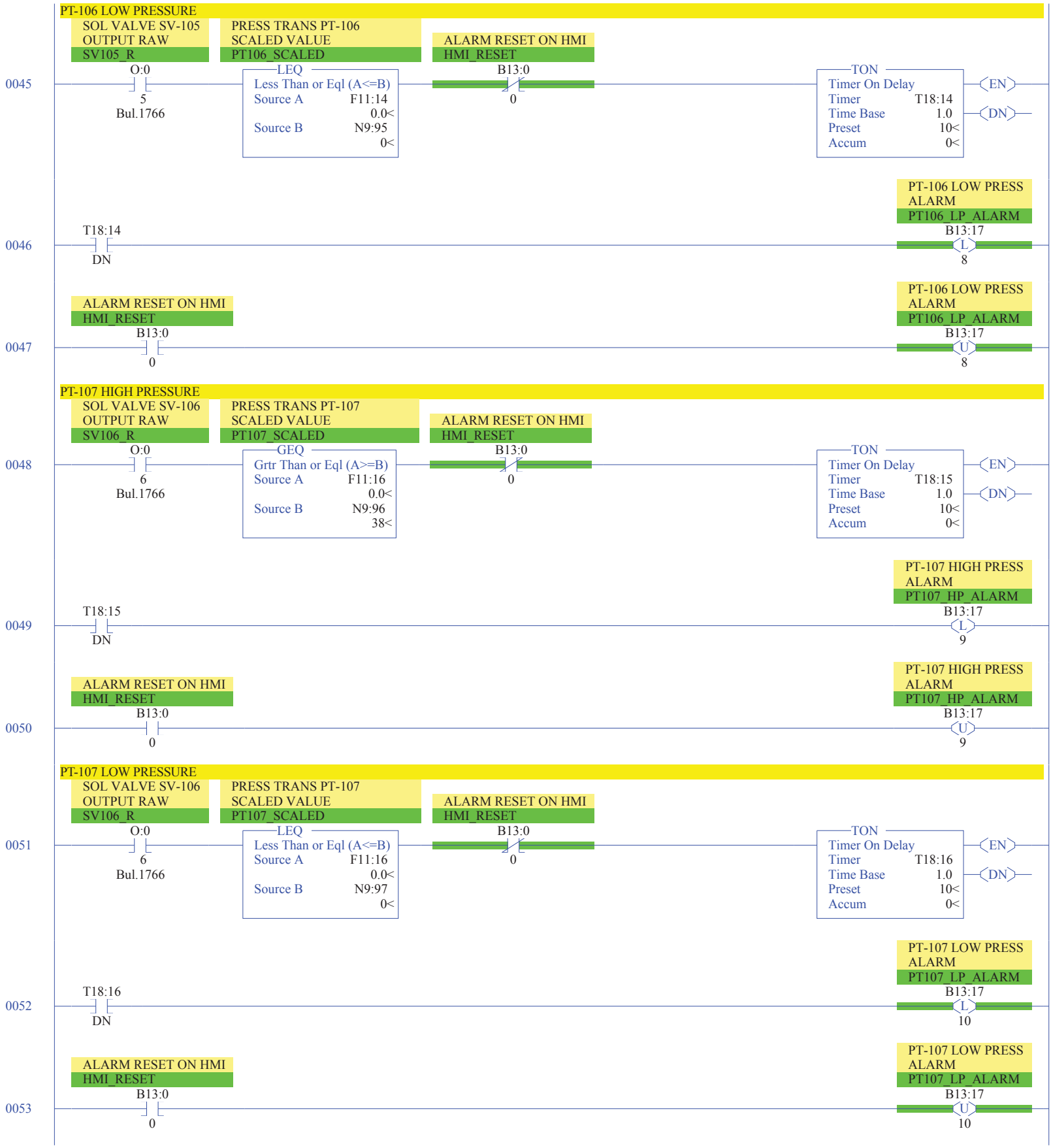
0033
SOL VALVE SV-103 OUTPUT RAW
SV103_R
O:0
3
Bul.1766
PRESS TRANS PT-104 SCALED VALUE
PT104_SCALED
LEQ
Less Than or Eql (A<=B)
Source A F11:10 0.0<
Source B N9:91 0<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:10
Time Base 1.0
Preset 10<
Accum 0<
EN
DN

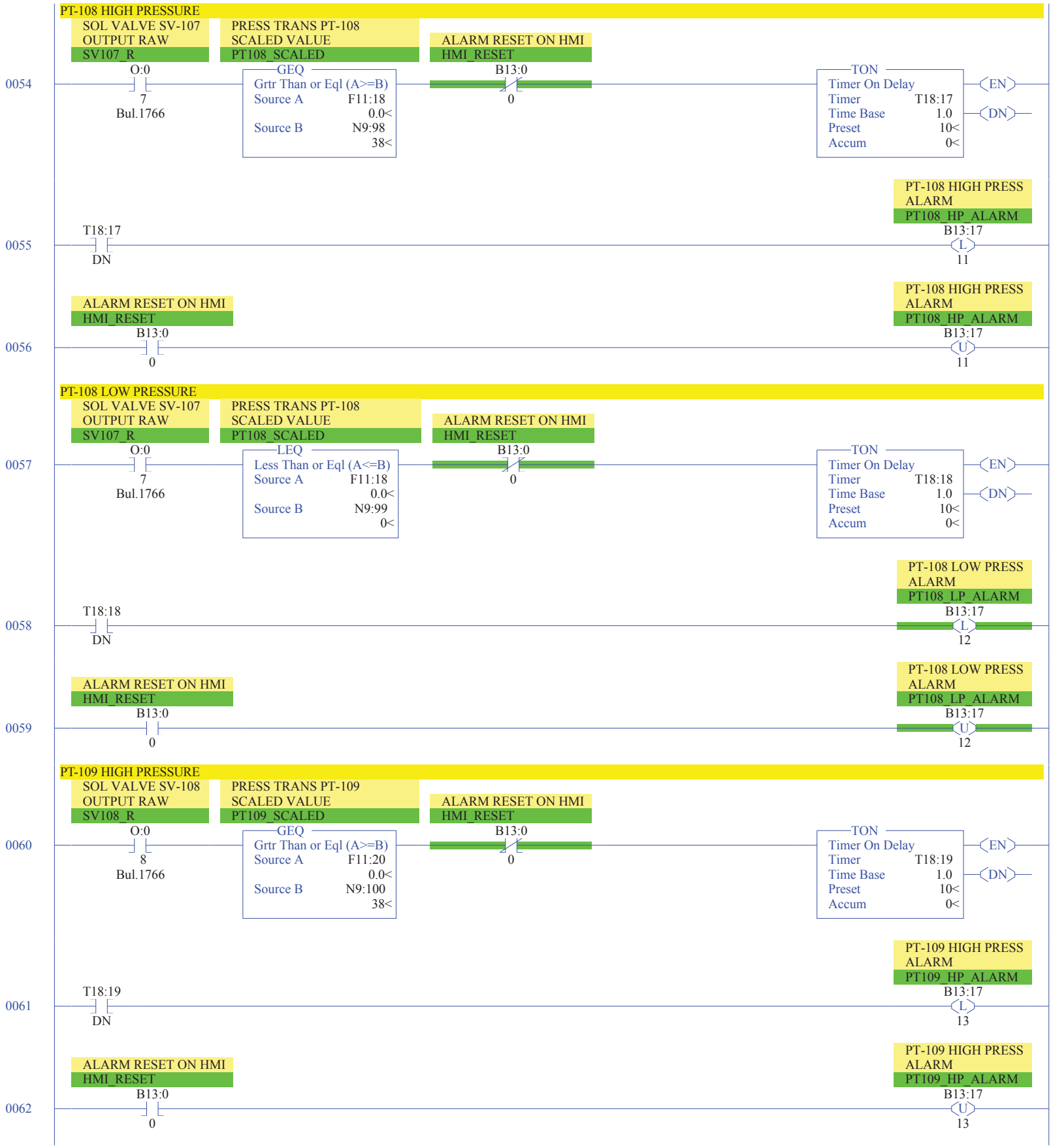
0034
T18:10
DN
PT-104 LOW PRESS ALARM
PT104_LP_ALARM
B13:17
L
4

0035
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-104 LOW PRESS ALARM
PT104_LP_ALARM
B13:17
U
4

LAD 4 - ALARMING - ALARM CODING --- Total Rungs in File = 89




PT-106 LOW PRESSURE
SOL VALVE SV-105 OUTPUT RAW
SV105_R
O:0
5
Bul.1766
PRESS TRANS PT-106 SCALED VALUE
PT106_SCALED
LEQ
Less Than or Eql (A<=B)
Source A F11:14 0.0<
Source B N9:95 0<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:14
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
0045
PT-106 LOW PRESS ALARM
PT106_LP_ALARM
B13:17
L
8
T18:14
DN
0046
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-106 LOW PRESS ALARM
PT106_LP_ALARM
B13:17
U
8
0047
PT-107 HIGH PRESSURE
SOL VALVE SV-106 OUTPUT RAW
SV106_R
O:0
6
Bul.1766
PRESS TRANS PT-107 SCALED VALUE
PT107_SCALED
GEQ
Grtr Than or Eql (A>=B)
Source A F11:16 0.0<
Source B N9:96 38<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:15
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
0048
PT-107 HIGH PRESS ALARM
PT107_HP_ALARM
B13:17
L
9
T18:15
DN
0049
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-107 HIGH PRESS ALARM
PT107_HP_ALARM
B13:17
U
9
0050
PT-107 LOW PRESSURE
SOL VALVE SV-106 OUTPUT RAW
SV106_R
O:0
6
Bul.1766
PRESS TRANS PT-107 SCALED VALUE
PT107_SCALED
LEQ
Less Than or Eql (A<=B)
Source A F11:16 0.0<
Source B N9:97 0<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:16
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
0051
PT-107 LOW PRESS ALARM
PT107_LP_ALARM
B13:17
L
10
T18:16
DN
0052
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-107 LOW PRESS ALARM
PT107_LP_ALARM
B13:17
U
10
0053


PT-108 HIGH PRESSURE
SOL VALVE SV-107 OUTPUT RAW
SV107_R
O:0
7
Bul.1766
PRESS TRANS PT-108 SCALED VALUE
PT108_SCALED
GEQ
Grtr Than or Eql (A>=B)
Source A F11:18 0.0<
Source B N9:98 38<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:17
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
0054
PT-108 HIGH PRESS ALARM
PT108_HP_ALARM
B13:17
L
11
T18:17
DN
0055
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-108 HIGH PRESS ALARM
PT108_HP_ALARM
B13:17
U
11
0056
PT-108 LOW PRESSURE
SOL VALVE SV-107 OUTPUT RAW
SV107_R
O:0
7
Bul.1766
PRESS TRANS PT-108 SCALED VALUE
PT108_SCALED
LEQ
Less Than or Eql (A<=B)
Source A F11:18 0.0<
Source B N9:99 0<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:18
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
0057
PT-108 LOW PRESS ALARM
PT108_LP_ALARM
B13:17
L
12
T18:18
DN
0058
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-108 LOW PRESS ALARM
PT108_LP_ALARM
B13:17
U
12
0059
PT-109 HIGH PRESSURE
SOL VALVE SV-108 OUTPUT RAW
SV108_R
O:0
8
Bul.1766
PRESS TRANS PT-109 SCALED VALUE
PT109_SCALED
GEQ
Grtr Than or Eql (A>=B)
Source A F11:20 0.0<
Source B N9:100 38<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:19
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
0060
PT-109 HIGH PRESS ALARM
PT109_HP_ALARM
B13:17
L
13
T18:19
DN
0061
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-109 HIGH PRESS ALARM
PT109_HP_ALARM
B13:17
U
13
0062

PT-109 LOW PRESSURE

0063
SOL VALVE SV-108 OUTPUT RAW
SV108_R
O:0
8
Bul.1766
PRESS TRANS PT-109 SCALED VALUE
PT109_SCALED
LEQ
Less Than or Eql (A<=B)
Source A F11:20 0.0<
Source B N9:101 0<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:20
Time Base 1.0
Preset 10<
Accum 0<
EN
DN

0064
T18:20
DN
PT-109 LOW PRESS ALARM
PT109_LP_ALARM
B13:17
L
14

0065
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-109 LOW PRESS ALARM
PT109_LP_ALARM
B13:17
U
14

PT-110 HIGH PRESSURE

0066
SOL VALVE SV-109 OUTPUT RAW
SV109_R
O:0
9
Bul.1766
PRESS TRANS PT-110 SCALED VALUE
PT110_SCALED
GEQ
Grtr Than or Eql (A>=B)
Source A F11:22 0.0<
Source B N9:102 38<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:21
Time Base 1.0
Preset 10<
Accum 0<
EN
DN

0067
T18:21
DN
PT-110 HIGH PRESS ALARM
PT110_HP_ALARM
B13:17
L
15

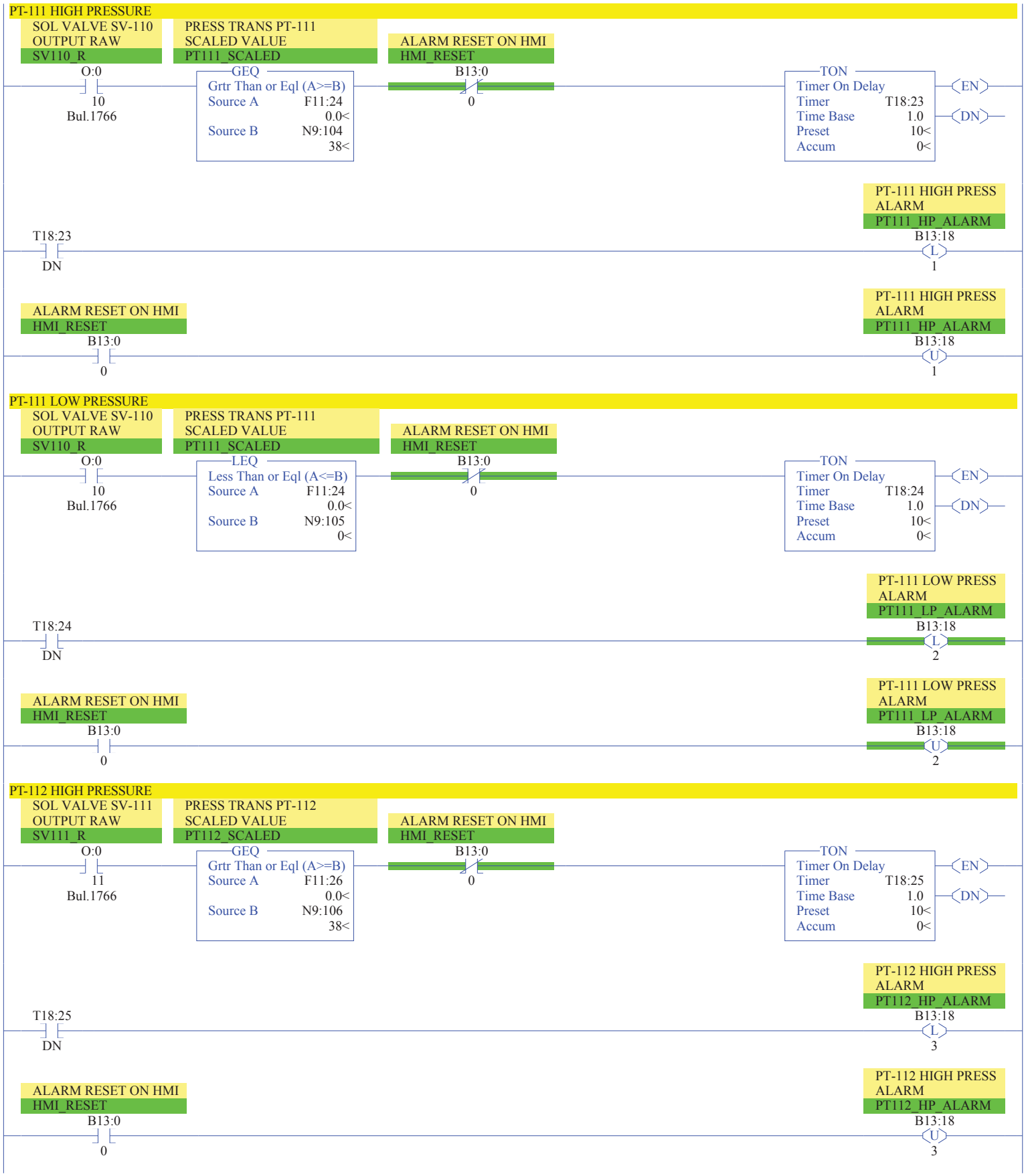
0068
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-110 HIGH PRESS ALARM
PT110_HP_ALARM
B13:17
U
15

PT-110 LOW PRESSURE

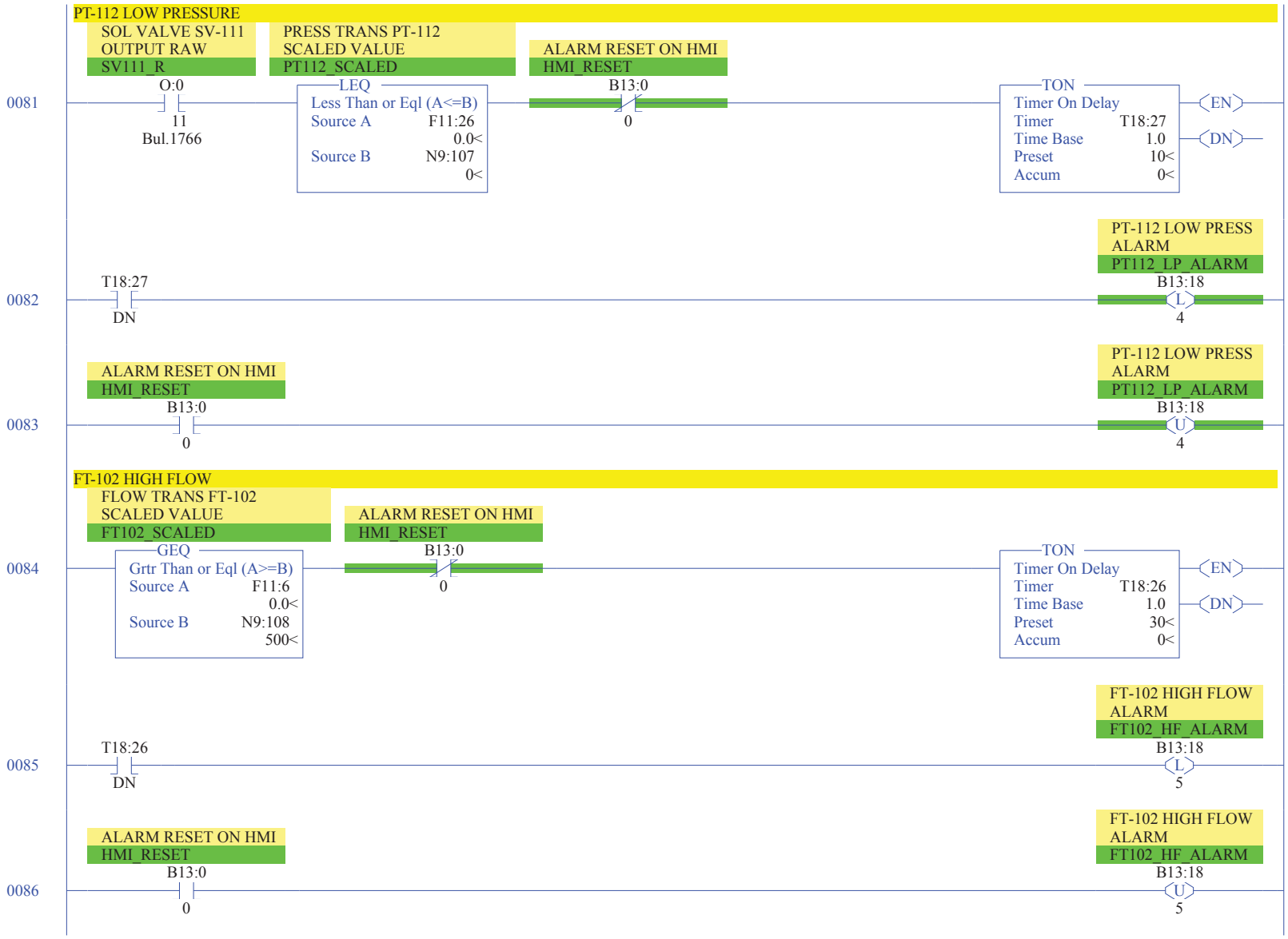
0069
SOL VALVE SV-109 OUTPUT RAW
SV109_R
O:0
9
Bul.1766
PRESS TRANS PT-110 SCALED VALUE
PT110_SCALED
LEQ
Less Than or Eql (A<=B)
Source A F11:22 0.0<
Source B N9:103 0<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:22
Time Base 1.0
Preset 10<
Accum 0<
EN
DN

0070
T18:22
DN
PT-110 LOW PRESS ALARM
PT110_LP_ALARM
B13:18
L
0

0071
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-110 LOW PRESS ALARM
PT110_LP_ALARM
B13:18
U
0


PT-111 HIGH PRESSURE
SOL VALVE SV-110 OUTPUT RAW
SV110_R
O:0
10
Bul.1766
PRESS TRANS PT-111 SCALED VALUE
PT111_SCALED
GEQ
Grtr Than or Eql (A>=B)
Source A F11:24 0.0<
Source B N9:104 38<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:23
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
0072
PT-111 HIGH PRESS ALARM
PT111_HP_ALARM
B13:18
L
1
T18:23
DN
0073
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-111 HIGH PRESS ALARM
PT111_HP_ALARM
B13:18
U
1
0074
PT-111 LOW PRESSURE
SOL VALVE SV-110 OUTPUT RAW
SV110_R
O:0
10
Bul.1766
PRESS TRANS PT-111 SCALED VALUE
PT111_SCALED
LEQ
Less Than or Eql (A<=B)
Source A F11:24 0.0<
Source B N9:105 0<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:24
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
0075
PT-111 LOW PRESS ALARM
PT111_LP_ALARM
B13:18
L
2
T18:24
DN
0076
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-111 LOW PRESS ALARM
PT111_LP_ALARM
B13:18
U
2
0077
PT-112 HIGH PRESSURE
SOL VALVE SV-111 OUTPUT RAW
SV111_R
O:0
11
Bul.1766
PRESS TRANS PT-112 SCALED VALUE
PT112_SCALED
GEQ
Grtr Than or Eql (A>=B)
Source A F11:26 0.0<
Source B N9:106 38<
ALARM RESET ON HMI
HMI_RESET
B13:0
0
TON
Timer On Delay
Timer T18:25
Time Base 1.0
Preset 10<
Accum 0<
EN
DN
0078
PT-112 HIGH PRESS ALARM
PT112_HP_ALARM
B13:18
L
3
T18:25
DN
0079
ALARM RESET ON HMI
HMI_RESET
B13:0
0
PT-112 HIGH PRESS ALARM
PT112_HP_ALARM
B13:18
U
3
0080

LAD 4 - ALARMING - ALARM CODING --- Total Rungs in File = 89



COMPRESSOR AND MAIN SOLENOID INTERLOCK

0087

REL HUMIDITY ALARM
RH_ALARM
B13:16
5

INTERIOR HIGH TEMP ALARM
TT103_HT_ALARM
B13:16
6

PT-102 HIGH PRESSURE ALARM
PT102_HP_ALARM
B13:16
7

PT-102 LOW PRESS ALARM
PT102_LP_ALARM
B13:16
8

TT-101 HIGH TEMP ALARM
TT101_HT_ALARM
B13:16
9

PT-101HIGH PRESS ALARM
PT101_HP_ALARM
B13:16
10

PT-101 LOW PRESS ALARM
PT101_LP_ALARM
B13:16
11

FT-102 LOW FLOW ALARM
FT102_LF_ALARM
B13:16
12

FT-102 HIGH FLOW ALARM
FT102_HF_ALARM
B13:18
5

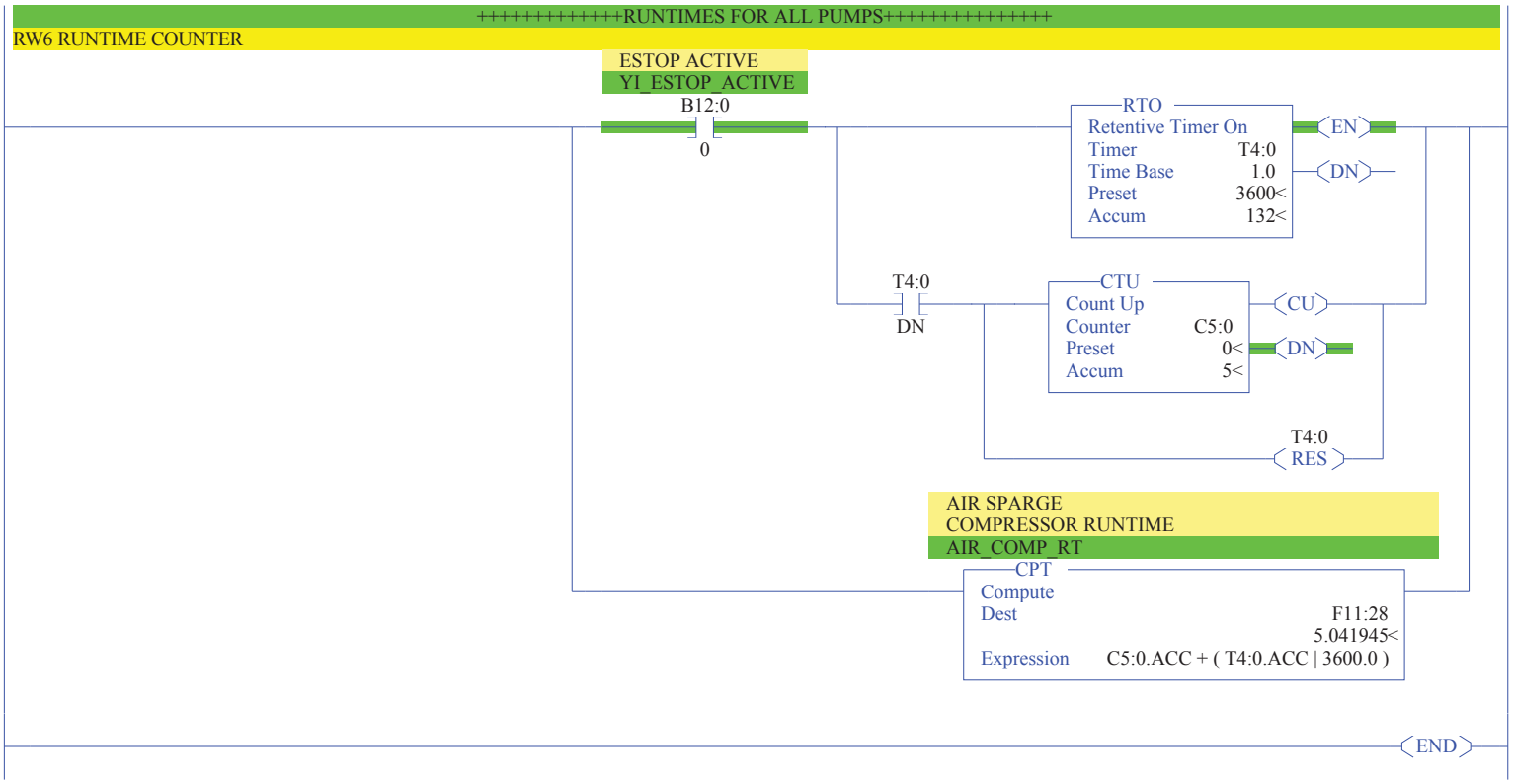
CONDENSATE SEP HI HI ALARM
COND_SEP_HH_ALARM
B12:0
2

SYSTEM COMMON ALARM/INTERLOCK
SYS_COMMON_INT
B13:18
6

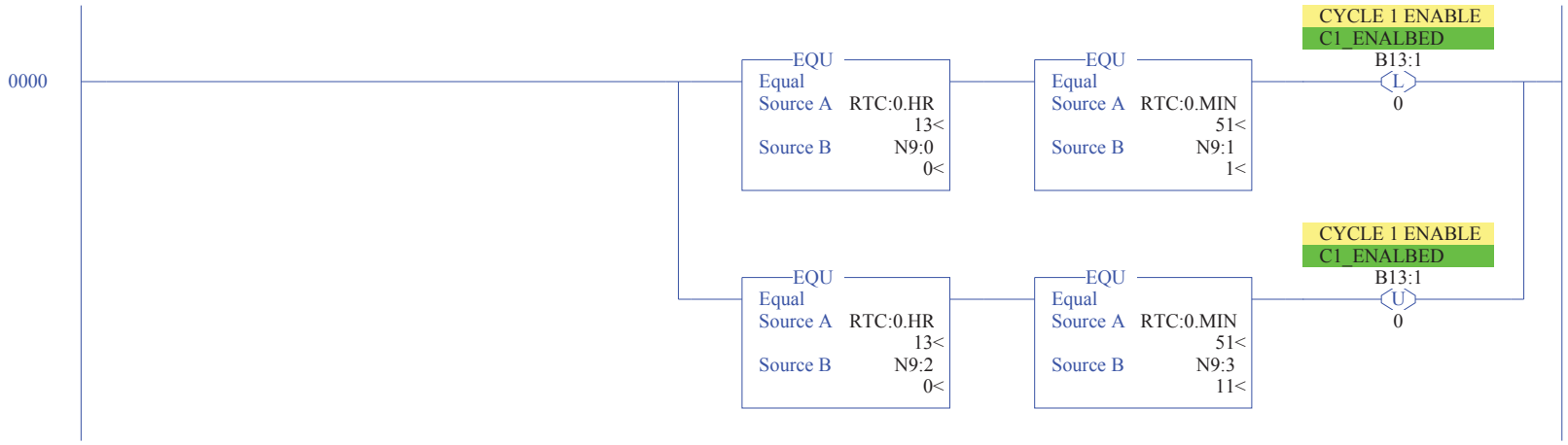
0088

END

LAD 5 - RUNTIMES - EQUIPMENT RUNTIMES --- Total Rungs in File = 2



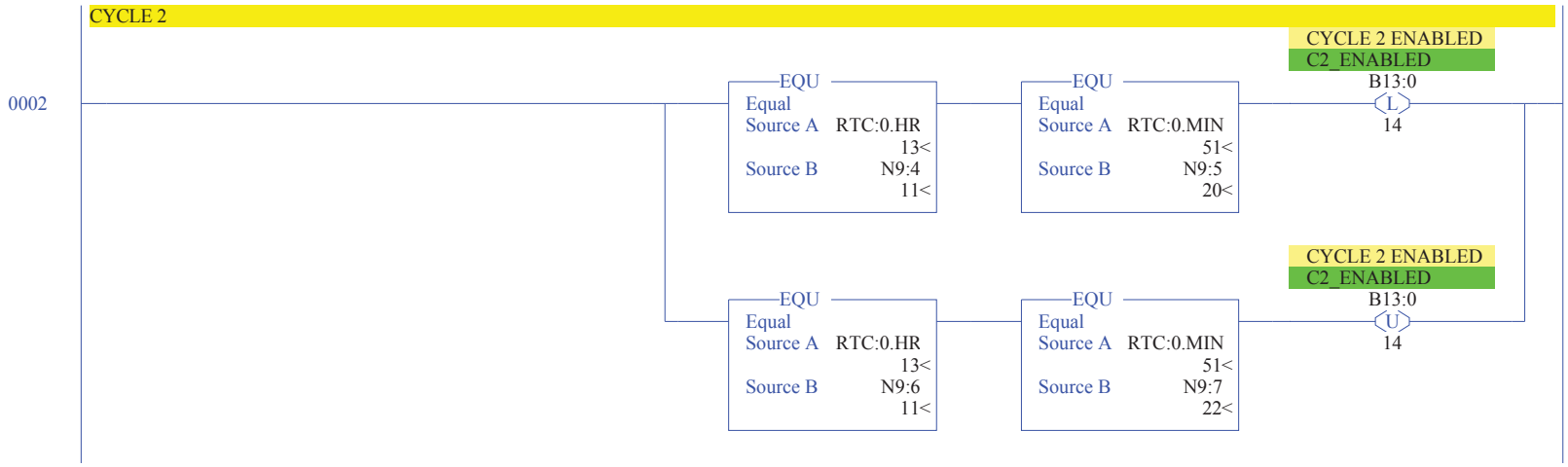
LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



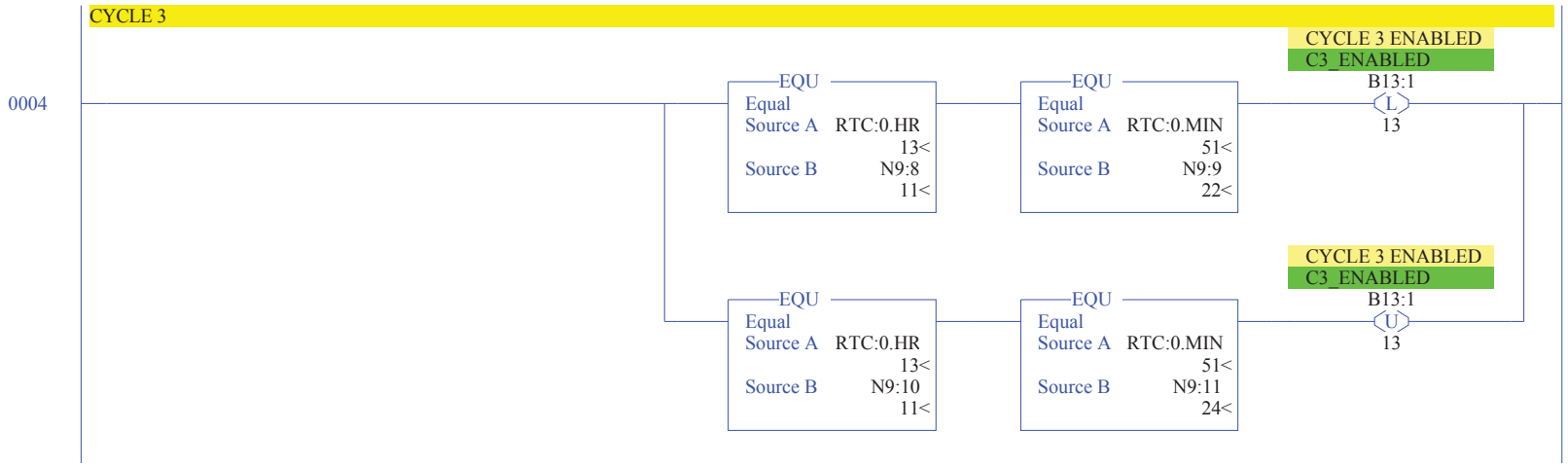
LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



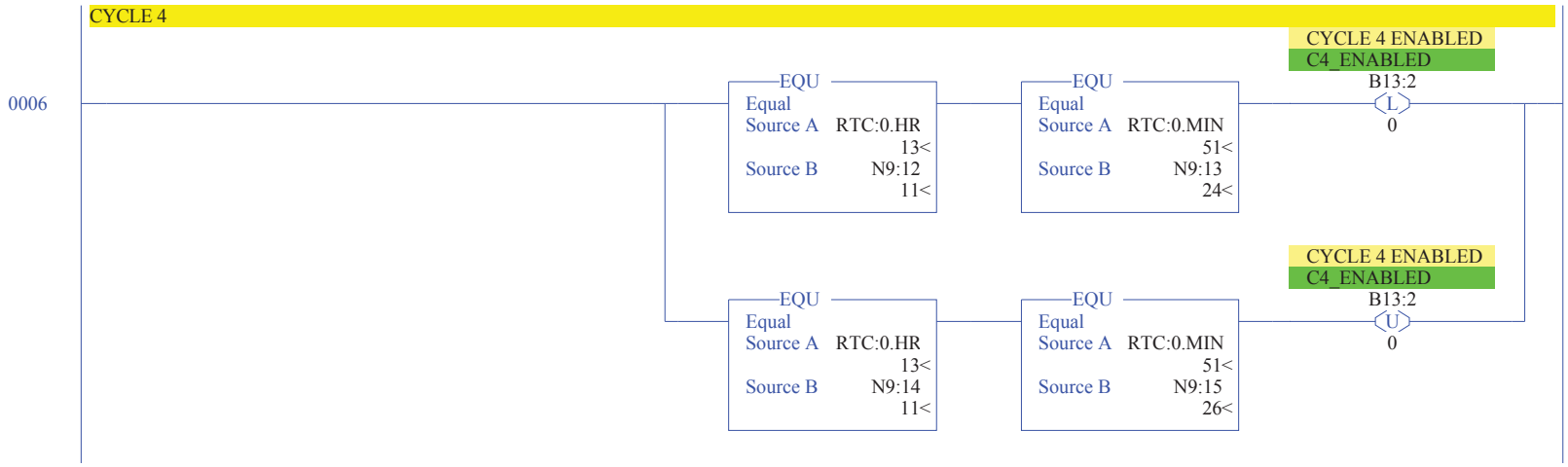
LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



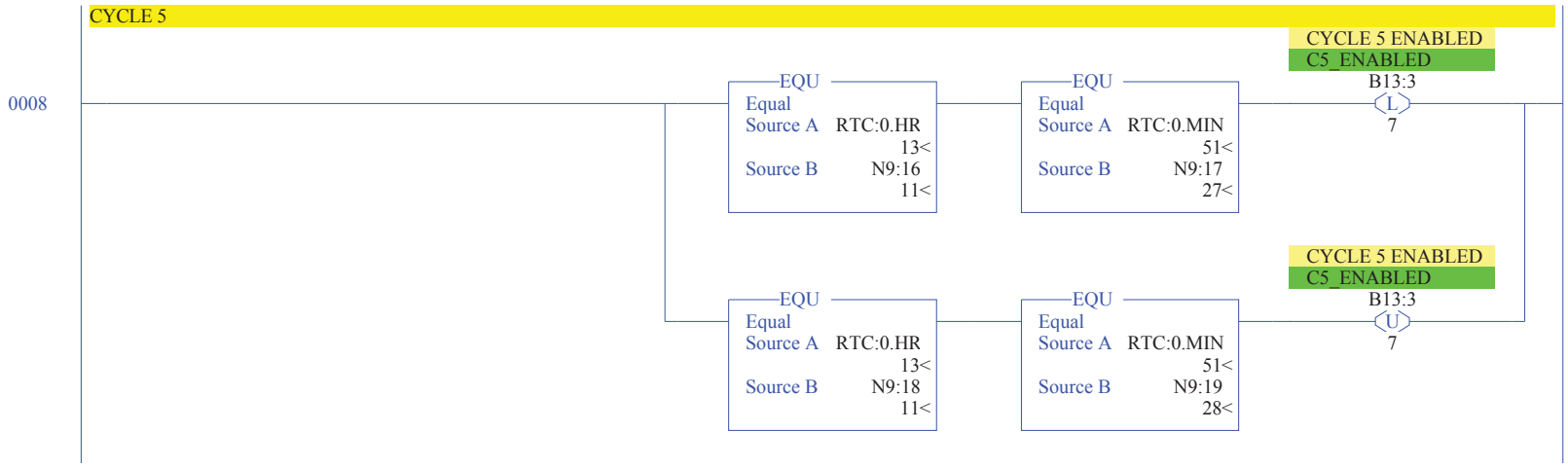
LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21

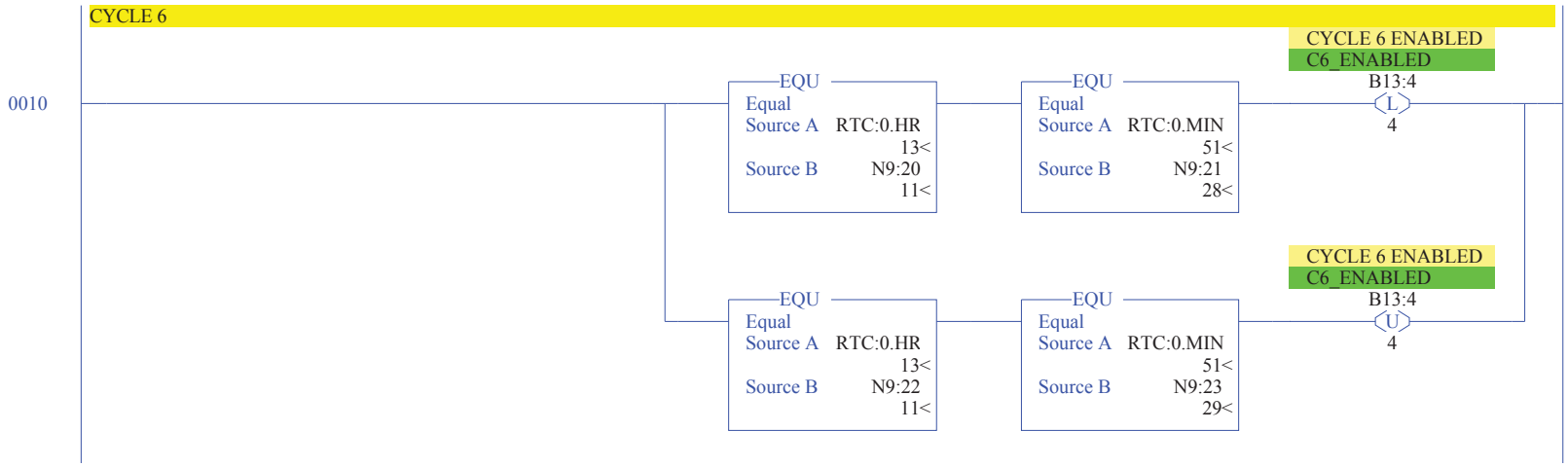


LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21

0009



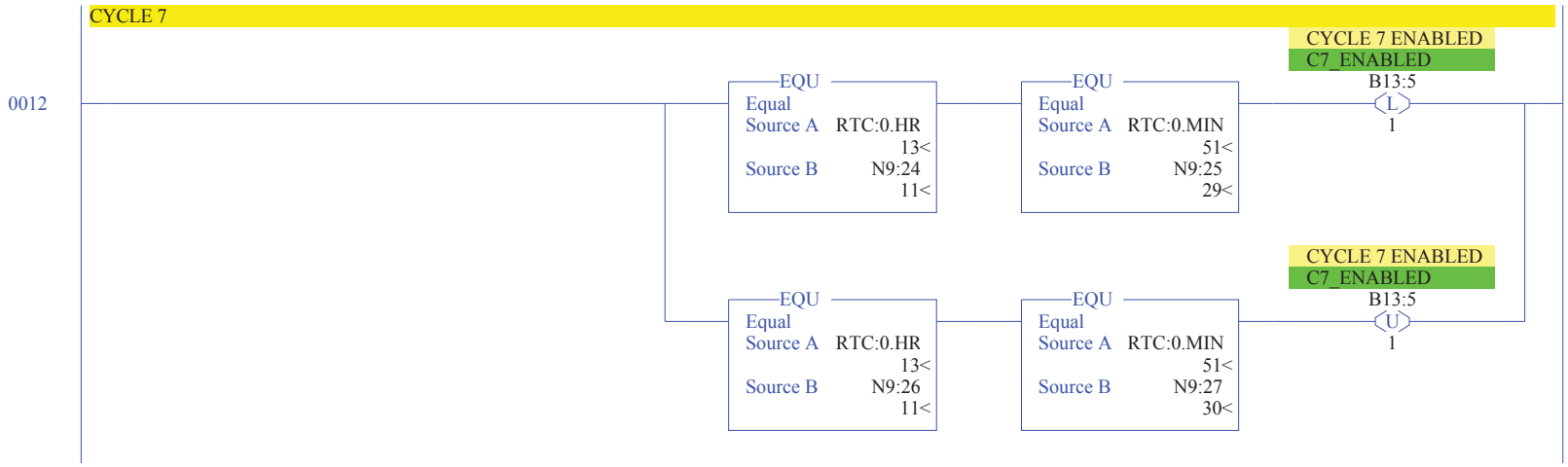
LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



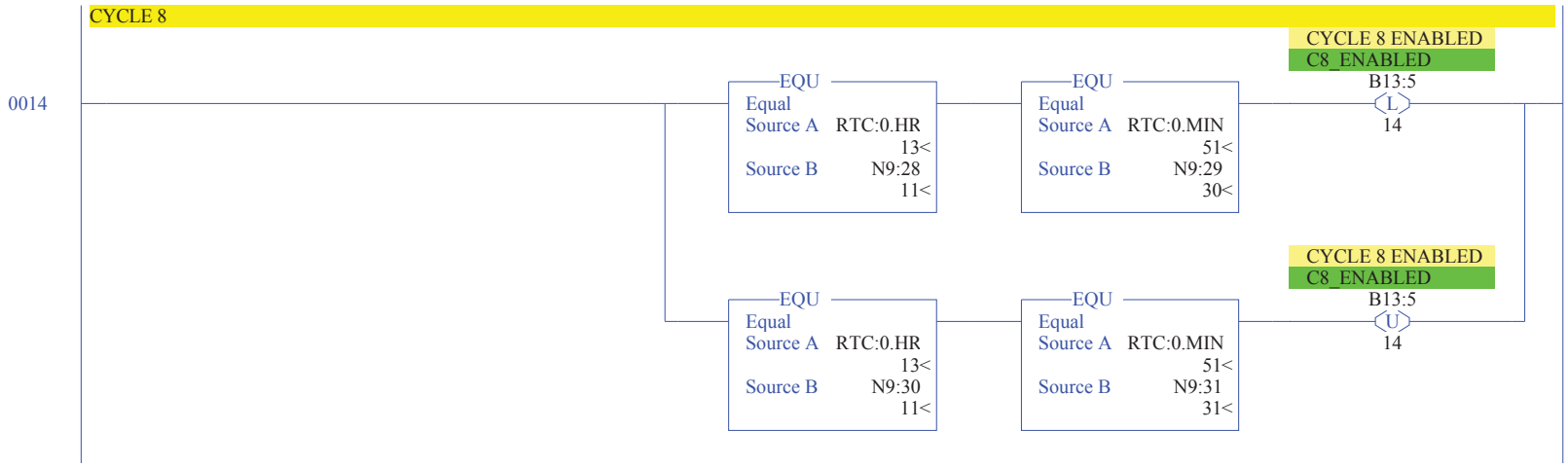
LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21

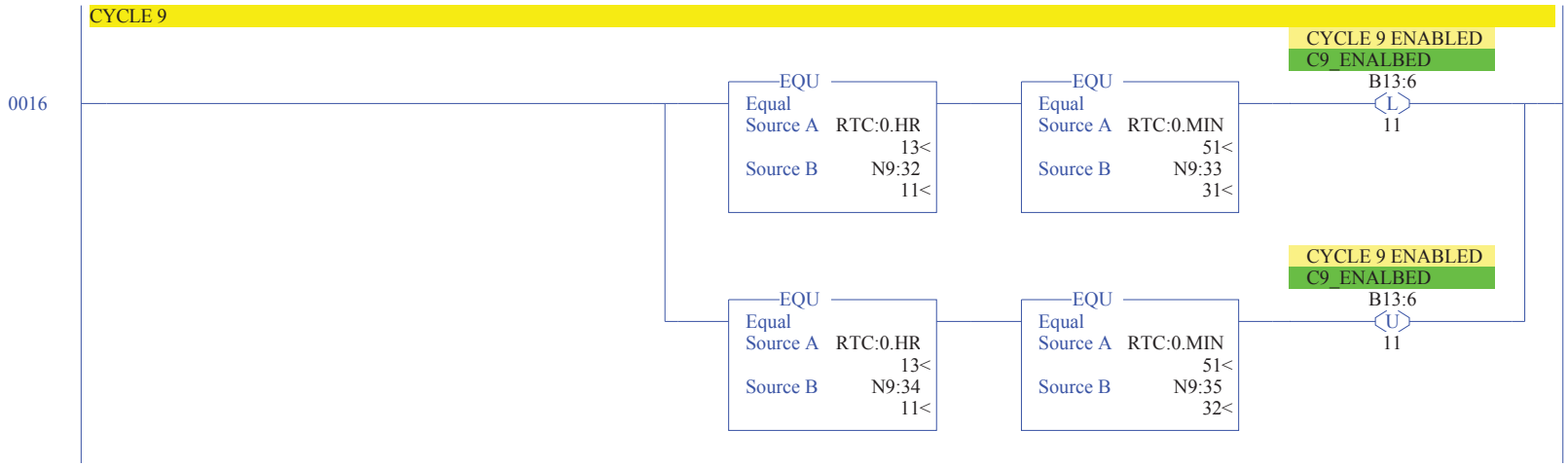


LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



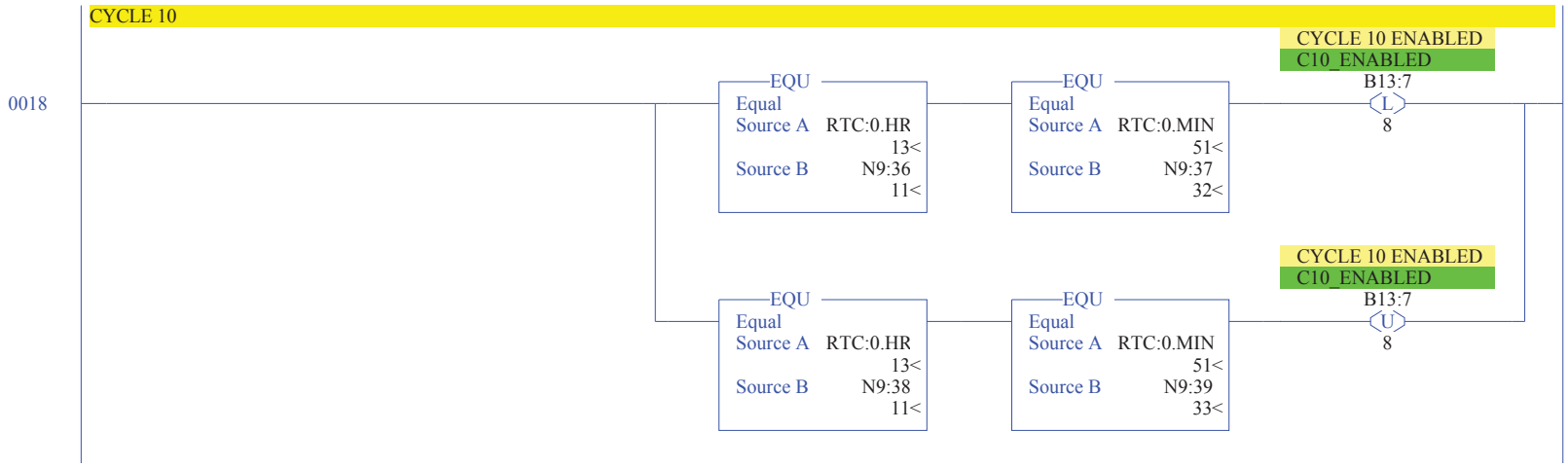

CYCLE 9
0016
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:32
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:33
31<
CYCLE 9 ENABLED
C9_ENALBED
B13:6
L
11
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:34
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:35
32<
CYCLE 9 ENABLED
C9_ENALBED
B13:6
U
11

LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21

0017

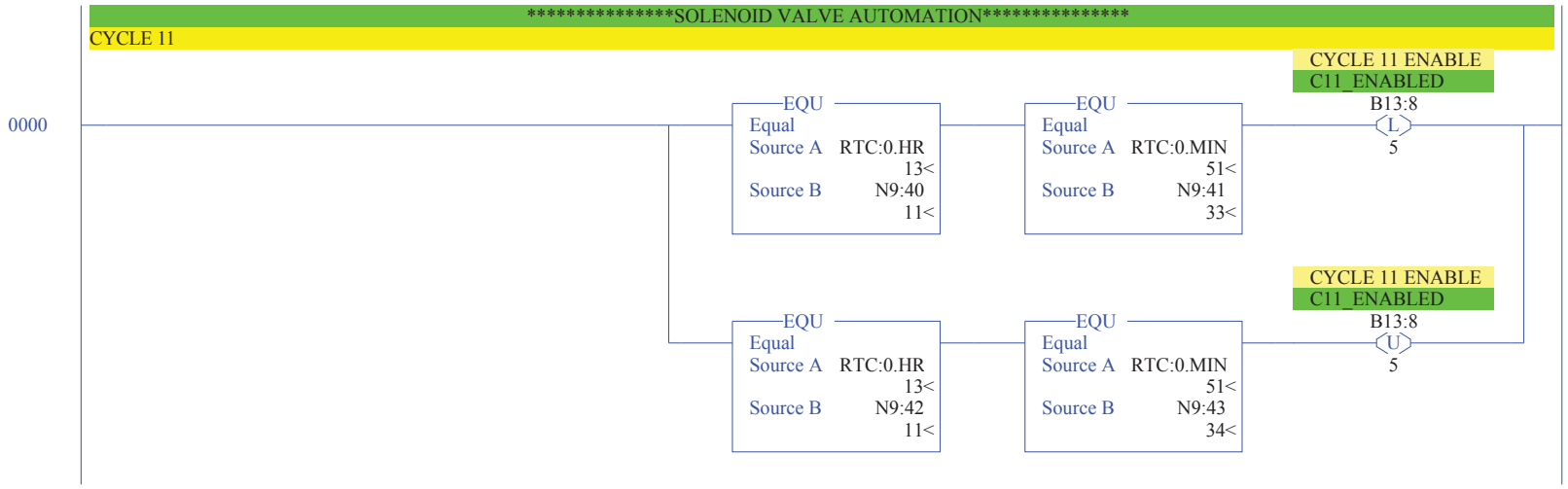


LAD 6 - CYCL_1_10 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21




0019
CYCLE 10 ENABLED
C10_ENABLED
B13:7
8
CYCLE 10 SELECT SV-102
C10_SELECT_SV102
B13:7
9
SV-102 CYCLE 10
SV102_C10
B12:7
4
CYCLE 10 SELECT SV-103
C10_SELECT_SV103
B13:7
10
SV-103 CYCLE 10
SV103_C10
B12:7
5
CYCLE 10 SELECT SV-104
C10_SELECT_SV104
B13:7
11
SV-104 CYCLE 10
SV104_C10
B12:7
6
CYCLE 10 SELECT SV-105
C10_SELECT_SV105
B13:7
12
SV-105 CYCLE 10
SV105_C10
B12:7
7
CYCLE 10 SELECT SV-106
C10_SELECT_SV106
B13:7
13
SV-106 CYCLE 10
SV106_C10
B12:7
8
CYCLE 10 SELECT SV-107
C10_SELECT_SV107
B13:7
14
SV-107 CYCLE 10
SV107_C10
B12:7
9
CYCLE 10 SELECT SV-108
C10_SELECT_SV108
B13:7
15
SV-108 CYCLE 10
SV108_C10
B12:7
10
CYCLE 10 SELECT SV-109
C10_SELECT_SV109
B13:8
0
SV-109 CYCLE 10
SV109_C10
B12:7
11
CYCLE 10 SELECT SV-110
C10_SELECT_SV110
B13:8
1
SV-110 CYCLE 10
SV110_C10
B12:7
12
CYCLE 10 SELECT SV-111
C10_SELECT_SV111
B13:8
2
SV-111 CYCLE 10
SV111_C10
B12:7
13
0020
END

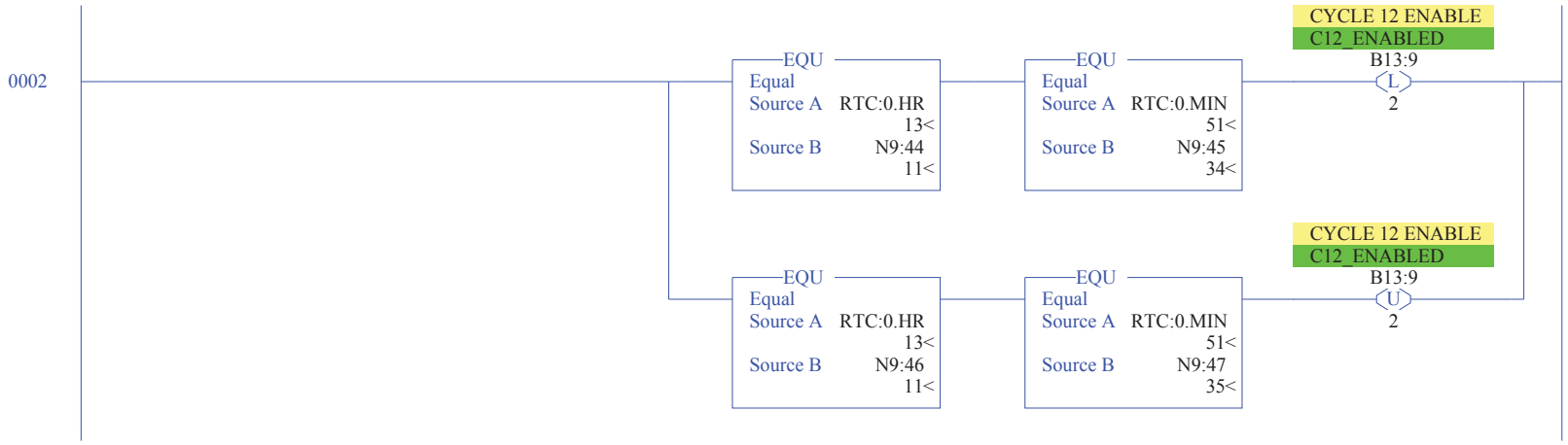
LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21

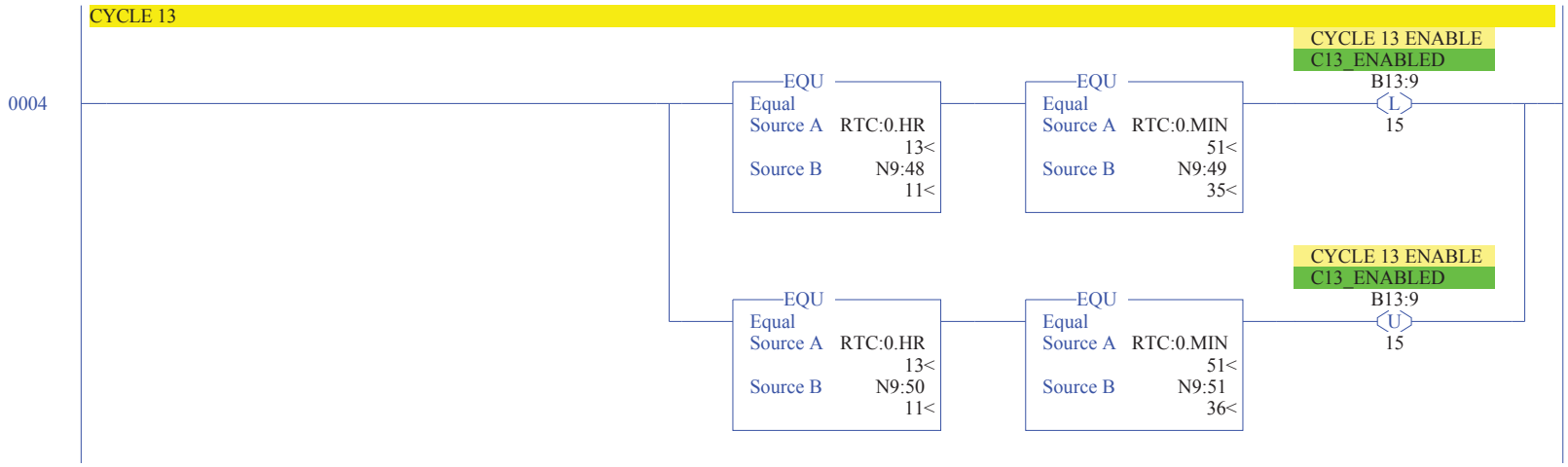
0001




0002
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:44
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:45
34<
CYCLE 12 ENABLE
C12_ENABLED
B13:9
L
2
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:46
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:47
35<
CYCLE 12 ENABLE
C12_ENABLED
B13:9
U
2

LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21

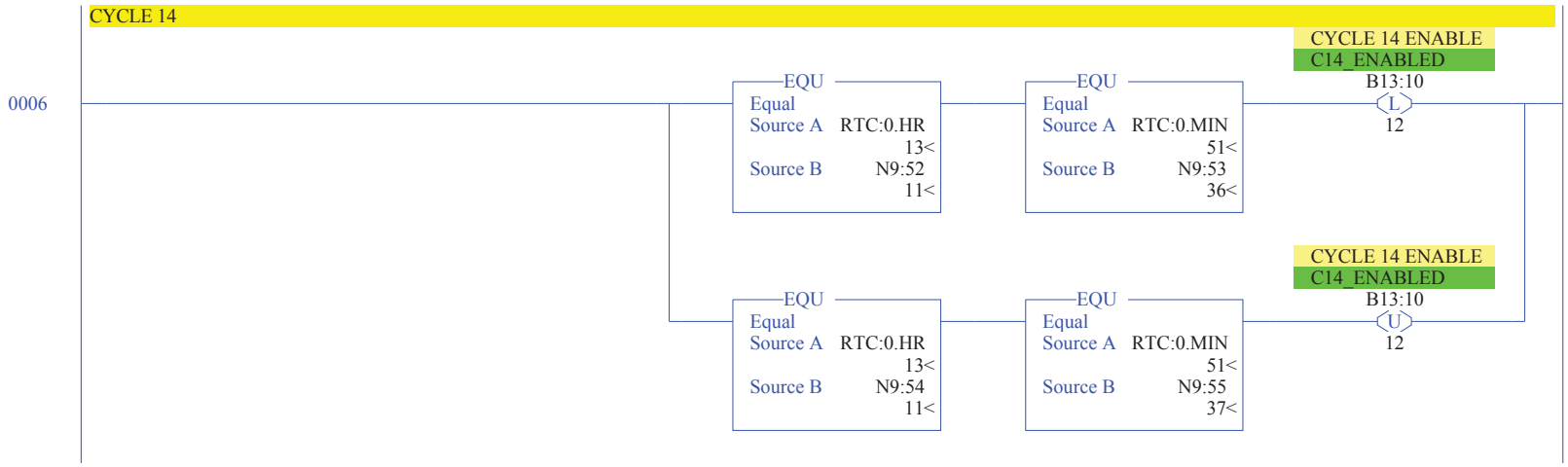



CYCLE 13
0004
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:48
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:49
35<
CYCLE 13 ENABLE
C13_ENABLED
B13:9
L
15
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:50
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:51
36<
CYCLE 13 ENABLE
C13_ENABLED
B13:9
U
15

LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21

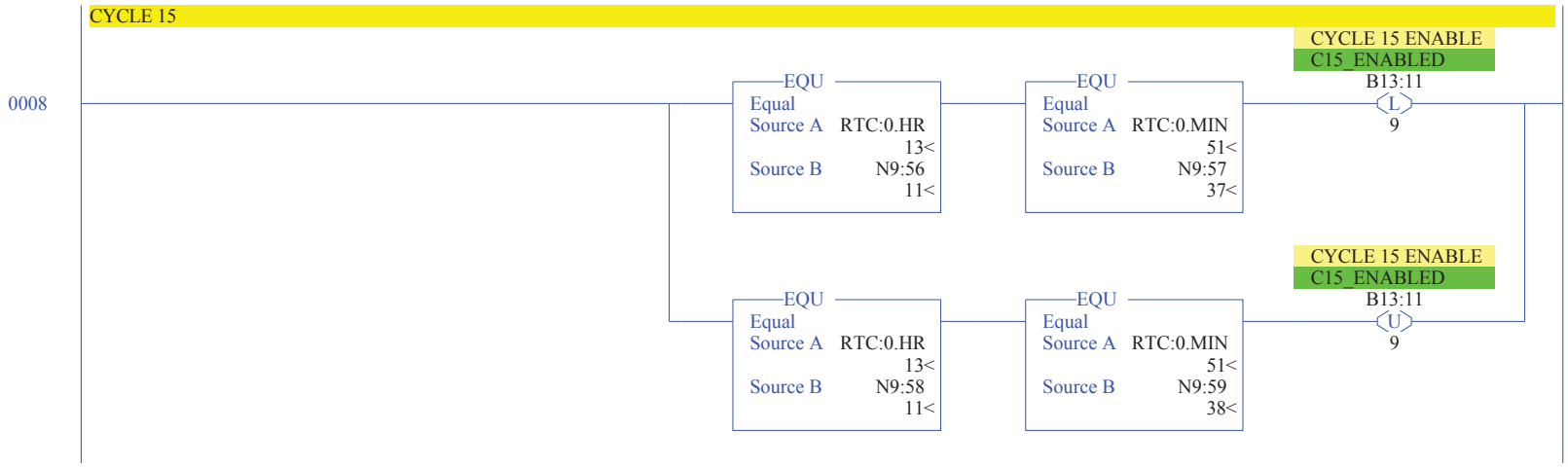
0005




CYCLE 14
0006
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:52
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:53
36<
CYCLE 14 ENABLE
C14_ENABLED
B13:10
L
12
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:54
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:55
37<
CYCLE 14 ENABLE
C14_ENABLED
B13:10
U
12


0007
CYCLE 14 ENABLE
C14_ENABLED
B13:10
12
CYCLE 14 SELECT SV-102
C14_SELECT_SV102
B13:10
13
SV-102 CYCLE 14
SV102_C14
B12:9
12
CYCLE 14 SELECT SV-103
C14_SELECT_SV103
B13:10
14
SV-103 CYCLE 14
SV103_C14
B12:9
13
CYCLE 14 SELECT SV-104
C14_SELECT_SV104
B13:10
15
SV-104 CYCLE 14
SV104_C14
B12:9
14
CYCLE 14 SELECT SV-105
C14_SELECT_SV105
B13:11
0
SV-105 CYCLE 14
SV105_C14
B12:9
15
CYCLE 14 SELECT SV-106
C14_SELECT_SV106
B13:11
1
SV-106 CYCLE 14
SV106_C14
B12:10
0
CYCLE 14 SELECT SV-107
C14_SELECT_SV107
B13:11
2
SV-107 CYCLE 14
SV107_C14
B12:10
1
CYCLE 14 SELECT SV-108
C14_SELECT_SV108
B13:11
3
SV-108 CYCLE 14
SV108_C14
B12:10
2
CYCLE 14 SELECT SV-109
C14_SELECT_SV109
B13:11
4
SV-109 CYCLE 14
SV109_C14
B12:10
3
CYCLE 14 SELECT SV-110
C14_SELECT_SV110
B13:11
5
SV-110 CYCLE 14
SV110_C14
B12:10
4
CYCLE 14 SELECT SV-111
C14_SELECT_SV111
B13:11
6
SV-111 CYCLE 14
SV111_C14
B12:10
5

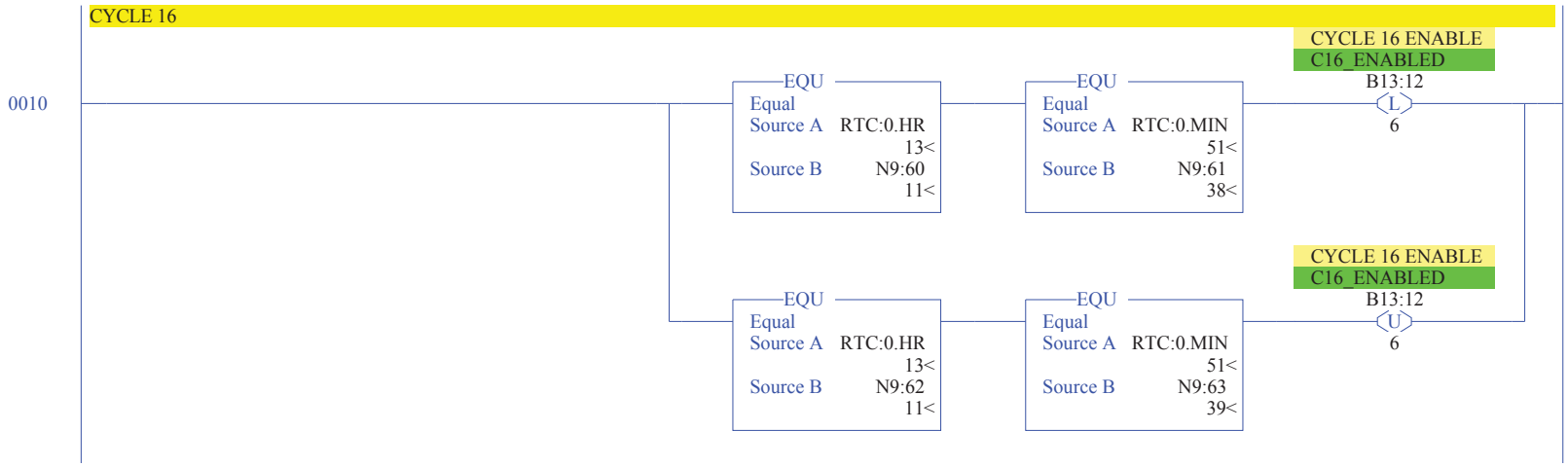
LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21

0009



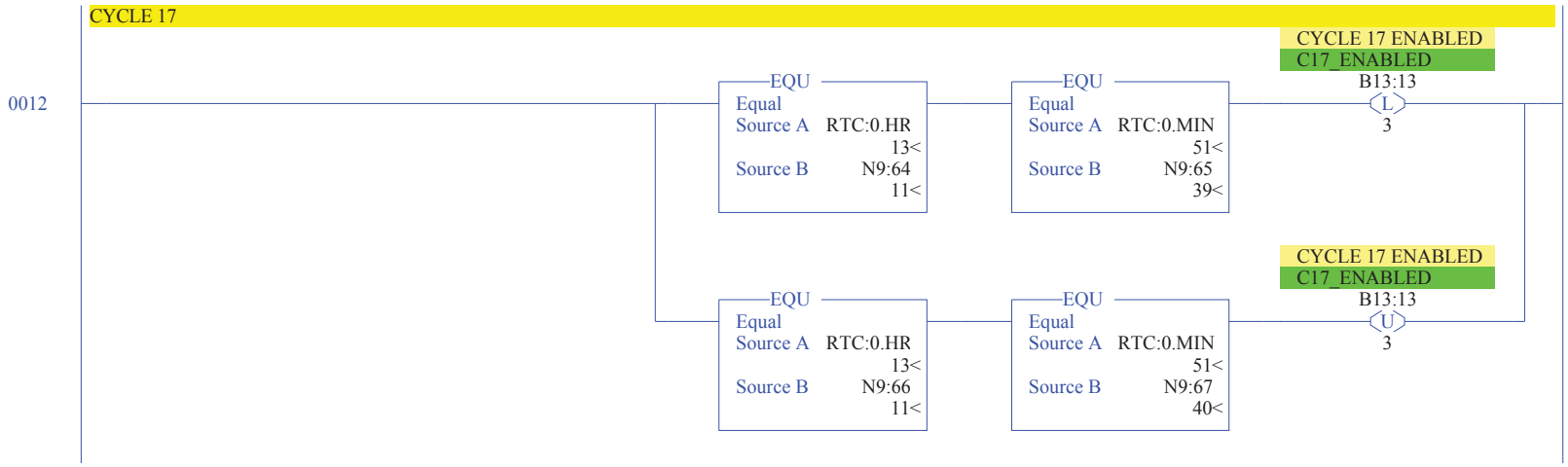

CYCLE 16
0010
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:60
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:61
38<
CYCLE 16 ENABLE
C16_ENABLED
B13:12
L
6
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:62
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:63
39<
CYCLE 16 ENABLE
C16_ENABLED
B13:12
U
6

LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21

0011



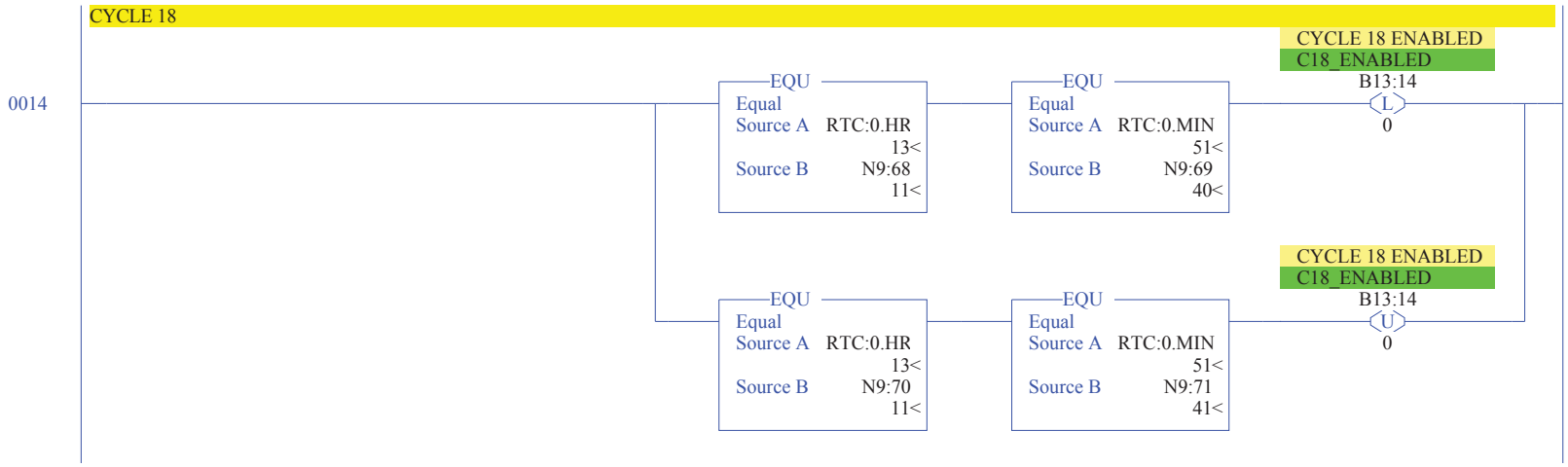
LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21

0013



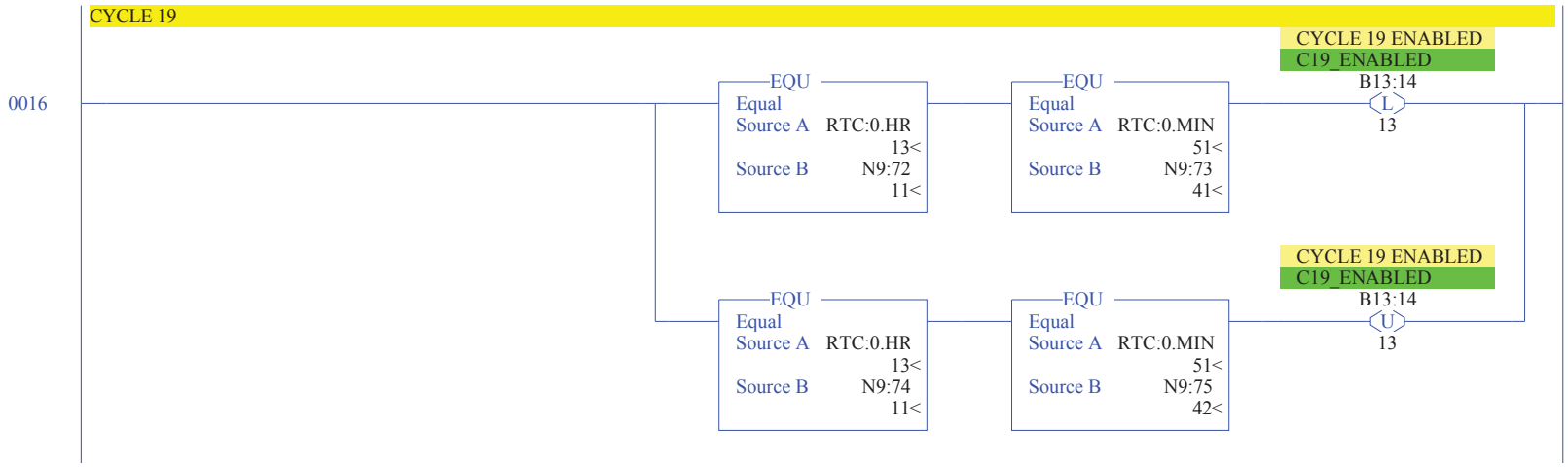

CYCLE 18
0014
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:68
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:69
40<
CYCLE 18 ENABLED
C18_ENABLED
B13:14
L
0
EQU
Equal
Source A RTC:0.HR
13<
Source B N9:70
11<
EQU
Equal
Source A RTC:0.MIN
51<
Source B N9:71
41<
CYCLE 18 ENABLED
C18_ENABLED
B13:14
U
0

LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21

0015

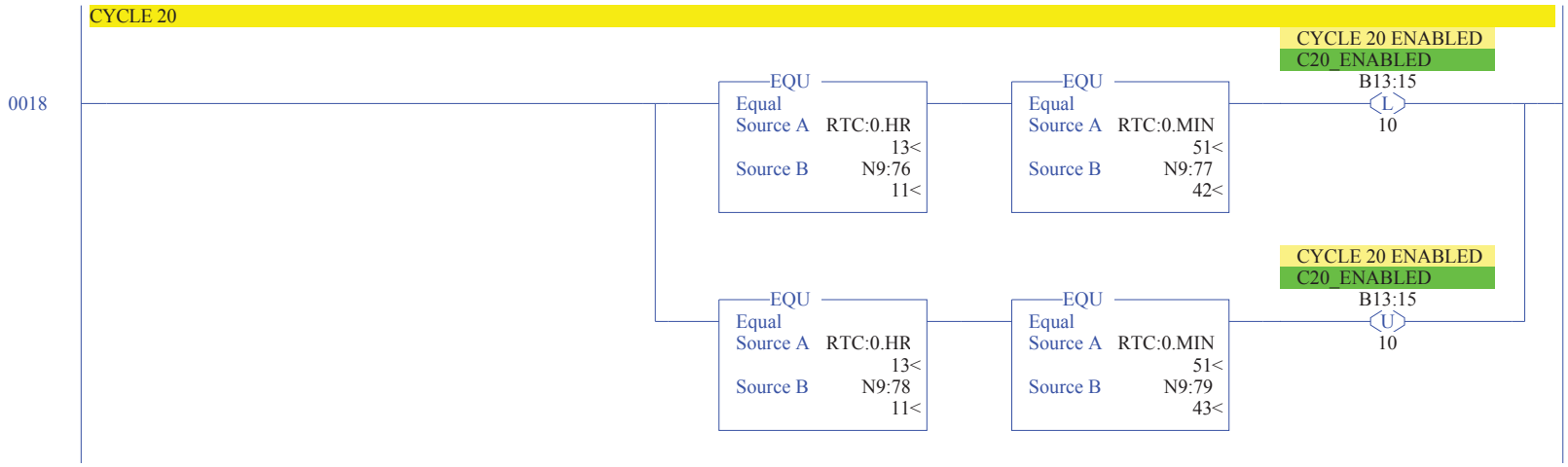


LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21



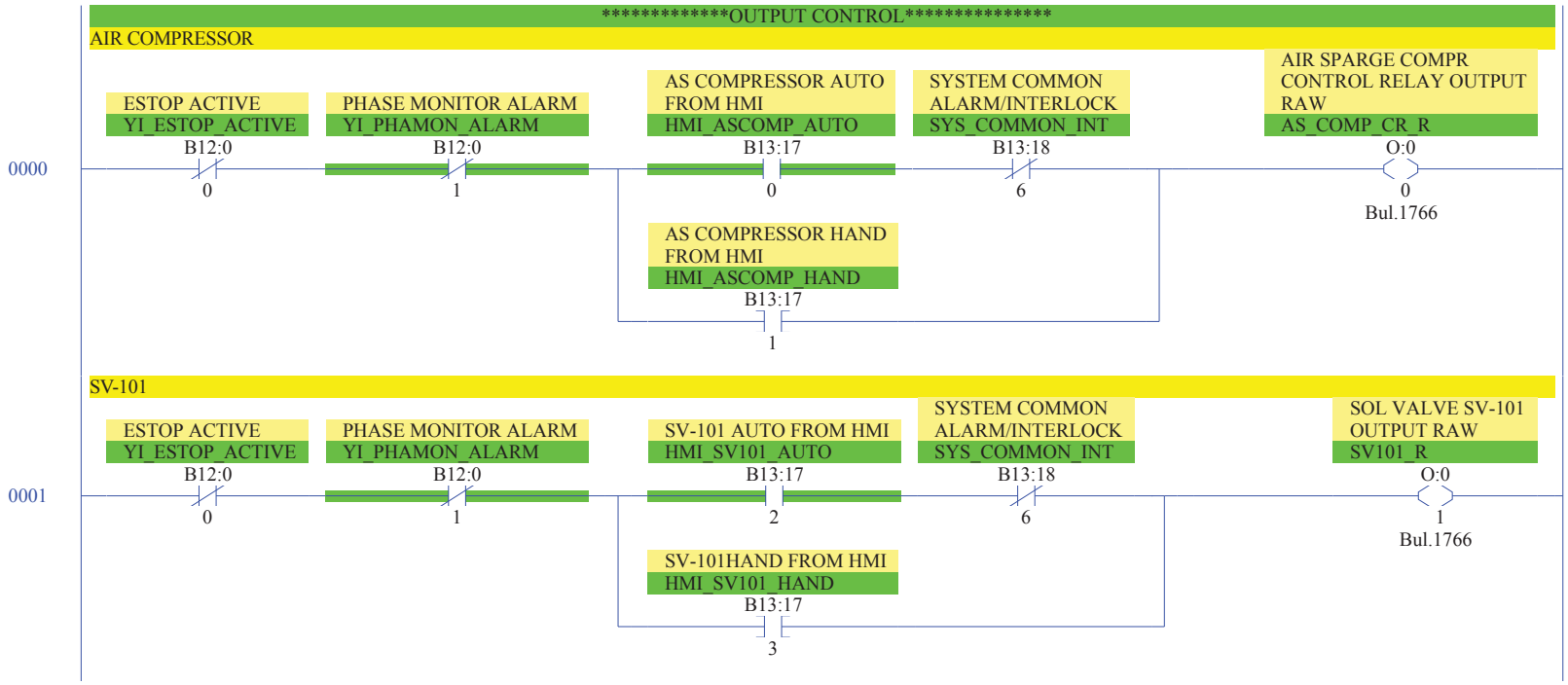

0017
CYCLE 19 ENABLED
C19_ENABLED
B13:14
13
CYCLE 19 SELECT SV-102
C19_SELECT_SV102
B13:14
14
SV-102 CYCLE 19
SV102_C19
B12:12
14
CYCLE 19 SELECT SV-103
C19_SELECT_SV103
B13:14
15
SV-103 CYCLE 19
SV103_C19
B12:12
15
CYCLE 19 SELECT SV-104
C19_SELECT_SV104
B13:15
0
SV-104 CYCLE 19
SV104_C19
B12:13
0
CYCLE 19 SELECT SV-105
C19_SELECT_SV105
B13:15
1
SV-105 CYCLE 19
SV105_C19
B12:13
1
CYCLE 19 SELECT SV-106
C19_SELECT_SV106
B13:15
2
SV-106 CYCLE 19
SV106_C19
B12:13
2
CYCLE 19 SELECT SV-107
C19_SELECT_SV107
B13:15
3
SV-107 CYCLE 19
SV107_C19
B12:13
3
CYCLE 19 SELECT SV-108
C19_SELECT_SV108
B13:15
4
SV-108 CYCLE 19
SV108_C19
B12:13
4
CYCLE 19 SELECT SV-109
C19_SELECT_SV109
B13:15
5
SV-109 CYCLE 19
SV109_C19
B12:13
5
CYCLE 19 SELECT SV-110
C19_SELECT_SV110
B13:15
6
SV-110 CYCLE 19
SV110_C19
B12:13
6
CYCLE 19 SELECT SV-111
C19_SELECT_SV111
B13:15
7
SV-111 CYCLE 19
SV111_C19
B12:13
7

LAD 7 - CYCL_11_20 - FLOW TOTALIZATION AND EQUIPMENT RUNTIMES --- Total Rungs in File = 21




0019
CYCLE 20 ENABLED
C20_ENABLED
B13:15
10
CYCLE 20 SELECT SV-102
C20_SELECT_SV102
B13:15
11
SV-102 CYCLE 20
SV102_C20
B12:13
8
CYCLE 20 SELECT SV-103
C20_SELECT_SV103
B13:15
12
SV-103 CYCLE 20
SV103_C20
B12:13
9
CYCLE 20 SELECT SV-104
C20_SELECT_SV104
B13:15
13
SV-104 CYCLE 20
SV104_C20
B12:13
10
CYCLE 20 SELECT SV-105
C20_SELECT_SV105
B13:15
14
SV-105 CYCLE 20
SV105_C20
B12:13
11
CYCLE 20 SELECT SV-106
C20_SELECT_SV106
B13:15
15
SV-106 CYCLE 20
SV106_C20
B12:13
12
CYCLE 20 SELECT SV-107
C20_SELECT_SV107
B13:16
0
SV-107 CYCLE 20
SV107_C20
B12:13
13
CYCLE 20 SELECT SV-108
C20_SELECT_SV108
B13:16
1
SV-108 CYCLE 20
SV108_C20
B12:13
14
CYCLE 20 SELECT SV-109
C20_SELECT_SV109
B13:16
2
SV-109 CYCLE 20
SV109_C20
B12:13
15
CYCLE 20 SELECT SV-110
C20_SELECT_SV110
B13:16
3
SV-110 CYCLE 20
SV110_C20
B12:14
0
CYCLE 20 SELECT SV-111
C20_SELECT_SV111
B13:16
4
SV-111 CYCLE 20
SV111_C20
B12:14
1
0020
END

LAD 8 - OUTPUT --- Total Rungs in File = 13



SV-102

0002

ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
0

SV-102 AUTO FROM HMI
HMI_SV102_AUTO
B12:1
0

SV-102 CYCLE 1
SV102_C1
B12:2
4

SV-102 CYCLE 2
SV102_C2
B12:2
14

SV-102 CYCLE 2
SV102_C2
B12:2
14

SV-102 CYCLE 4
SV102_C4
B12:3
8

SV-102 CYCLE 5
SV102_C5
B12:4
2

SV-102 CYCLE 6
SV102_C6
B12:4
12

SV-102 CYCLE 7
SV102_C7
B12:5
6

SV-102 CYCLE 8
SV102_C8
B12:6
0

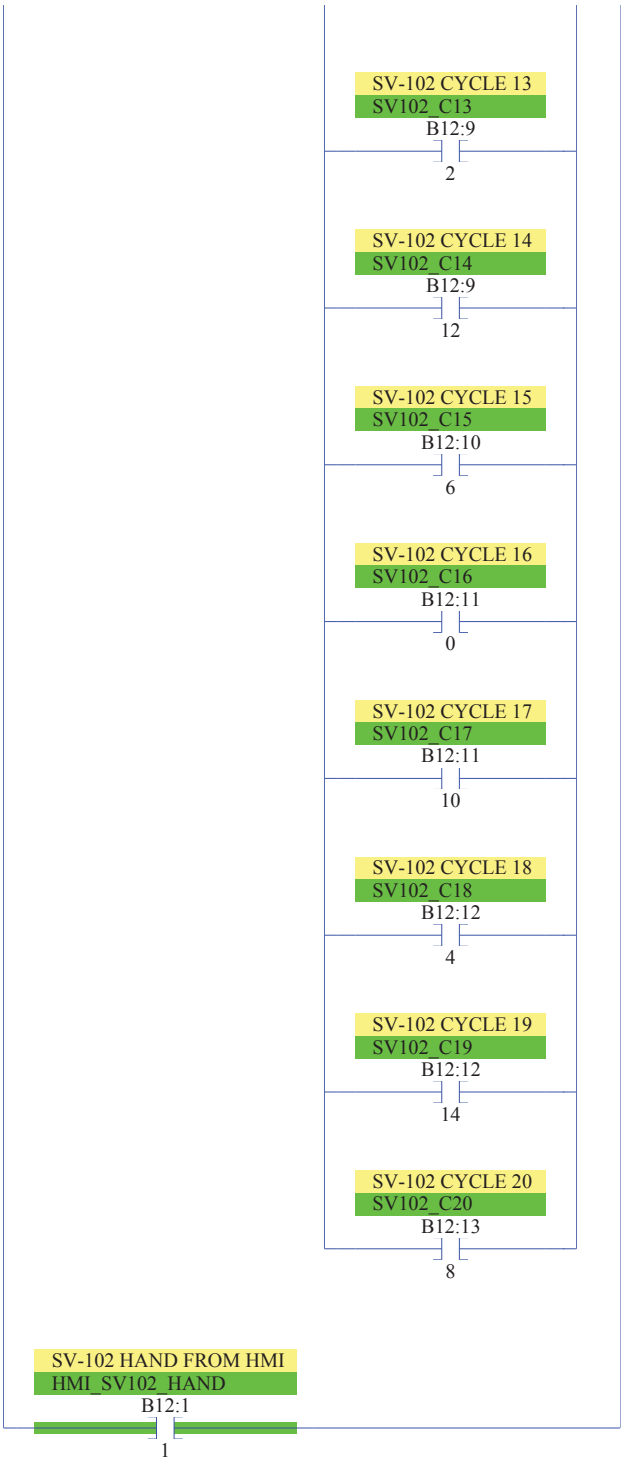
SV-102 CYCLE 9
SV102_C9
B12:6
10

SV-102 CYCLE 10
SV102_C10
B12:7
4

SV-102 CYCLE 11
SV102_C11
B12:7
14

SV-102 CYCLE 12
SV102_C12
B12:8
8

SOL VALVE SV-102
OUTPUT RAW
SV102_R
O:0
2
Bul.1766


SV-102 CYCLE 13
SV102_C13
B12:9
2
SV-102 CYCLE 14
SV102_C14
B12:9
12
SV-102 CYCLE 15
SV102_C15
B12:10
6
SV-102 CYCLE 16
SV102_C16
B12:11
0
SV-102 CYCLE 17
SV102_C17
B12:11
10
SV-102 CYCLE 18
SV102_C18
B12:12
4
SV-102 CYCLE 19
SV102_C19
B12:12
14
SV-102 CYCLE 20
SV102_C20
B12:13
8
SV-102 HAND FROM HMI
HMI_SV102_HAND
B12:1
1

SV-103

0003

ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
0

SV-103 AUTO FROM HMI
HMI_SV103_AUTO
B12:1
2

SV-103 CYCLE 1
SV103_C1
B12:2
5

SV-103 CYCLE 2
SV103_C2
B12:2
15

SV-103 CYCLE 3
SV103_C3
B12:14
3

SV-103 CYCLE 4
SV103_C4
B12:3
9

SV-103 CYCLE 5
SV103_C5
B12:4
3

SV-103 CYCLE 6
SV103_C6
B12:4
13

SV-103 CYCLE 7
SV103_C7
B12:5
7

SV-103 CYCLE 8
SV103_C8
B12:6
1

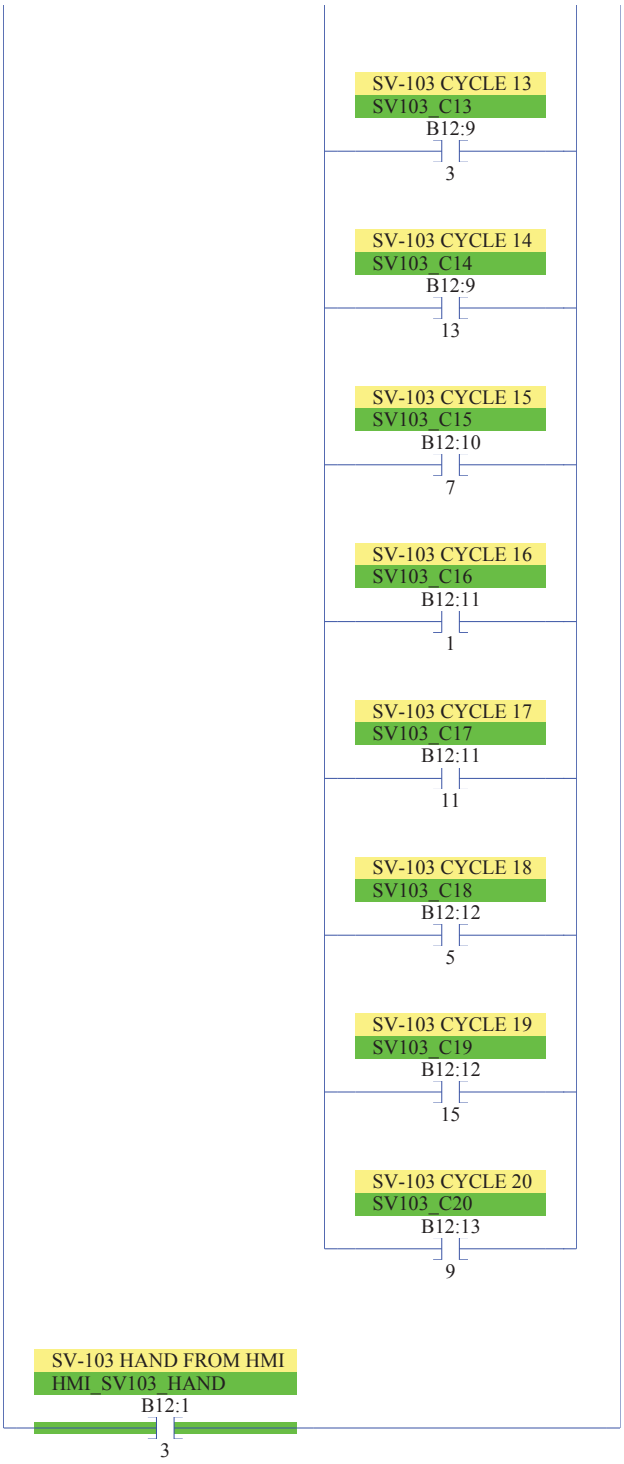
SV-103 CYCLE 9
SV103_C9
B12:6
11

SV-103 CYCLE 10
SV103_C10
B12:7
5

SV-103 CYCLE 11
SV103_C11
B12:7
15

SV-103 CYCLE 12
SV103_C12
B12:8
9

SOL VALVE SV-103
OUTPUT RAW
SV103_R
O:0
3
Bul.1766


SV-103 CYCLE 13
SV103_C13
B12:9
3
SV-103 CYCLE 14
SV103_C14
B12:9
13
SV-103 CYCLE 15
SV103_C15
B12:10
7
SV-103 CYCLE 16
SV103_C16
B12:11
1
SV-103 CYCLE 17
SV103_C17
B12:11
11
SV-103 CYCLE 18
SV103_C18
B12:12
5
SV-103 CYCLE 19
SV103_C19
B12:12
15
SV-103 CYCLE 20
SV103_C20
B12:13
9
SV-103 HAND FROM HMI
HMI_SV103_HAND
B12:1
3

SV-104

0004

ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
0

SV-104 AUTO FROM HMI
HMI_SV104_AUTO
B12:1
4

SV-104 CYCLE 1
SV104_C1
B12:2
6

SV-104 CYCLE 2
SV104_C2
B12:3
0

SV-104 CYCLE 3
SV104_C3
B12:14
4

SV-104 CYCLE 4
SV104_C4
B12:3
10

SV-104 CYCLE 5
SV104_C5
B12:4
4

SV-104 CYCLE 6
SV104_C6
B12:4
14

SV-104 CYCLE 7
SV104_C7
B12:5
8

SV-104 CYCLE 8
SV104_C8
B12:6
2

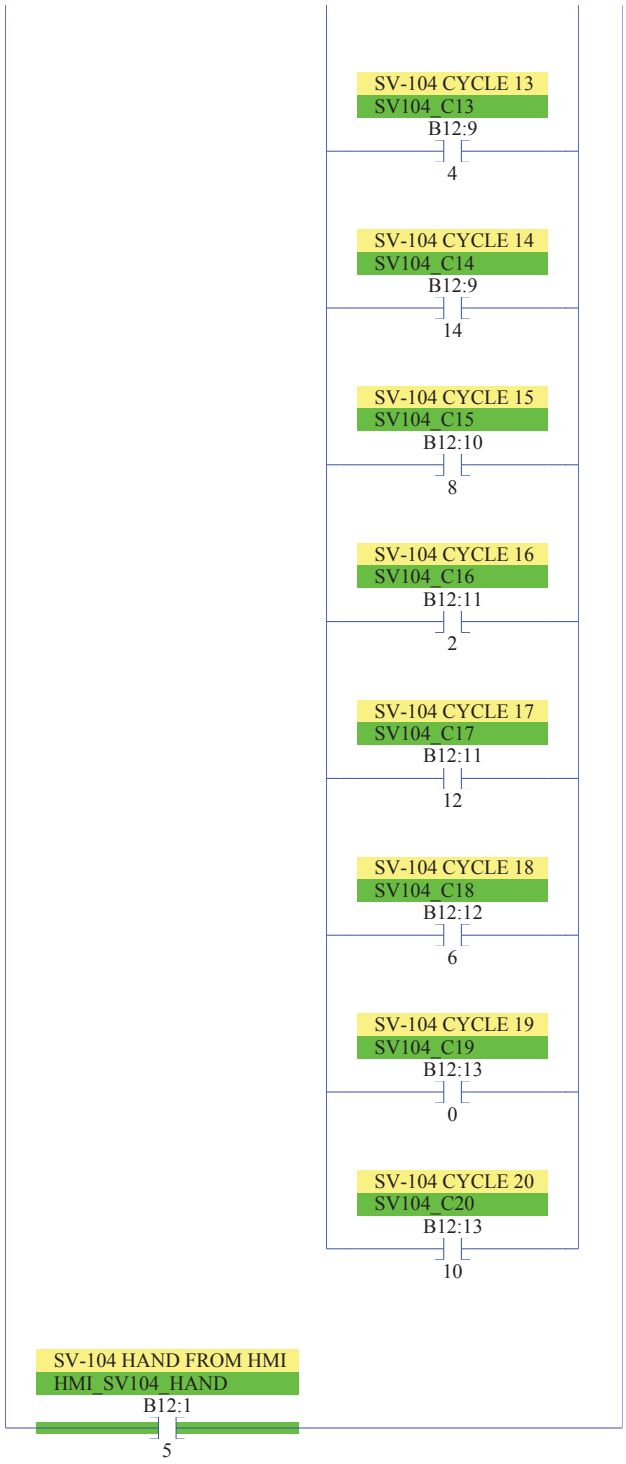
SV-104 CYCLE 9
SV104_C9
B12:6
12

SV-104 CYCLE 10
SV104_C10
B12:7
6

SV-104 CYCLE 11
SV104_C11
B12:8
0

SV-104 CYCLE 12
SV104_C12
B12:8
10

SOL VALVE SV-104
OUTPUT RAW
SV104_R
O:0
4
Bul.1766


SV-104 CYCLE 13
SV104_C13
B12:9
4
SV-104 CYCLE 14
SV104_C14
B12:9
14
SV-104 CYCLE 15
SV104_C15
B12:10
8
SV-104 CYCLE 16
SV104_C16
B12:11
2
SV-104 CYCLE 17
SV104_C17
B12:11
12
SV-104 CYCLE 18
SV104_C18
B12:12
6
SV-104 CYCLE 19
SV104_C19
B12:13
0
SV-104 CYCLE 20
SV104_C20
B12:13
10
SV-104 HAND FROM HMI
HMI_SV104_HAND
B12:1
5

SV-105

0005

ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
0

SV-105 AUTO FROM HMI
HMI_SV105_AUTO
B12:1
6

SV-105 CYCLE 1
SV105_C1
B12:2
7

SV-105 CYCLE 2
SV105_C2
B12:3
1

SV-105 CYCLE 3
SV105_C3
B12:14
5

SV-105 CYCLE 4
SV105_C4
B12:3
11

SV-105 CYCLE 5
SV105_C5
B12:4
5

SV-105 CYCLE 6
SV105_C6
B12:4
15

SV-105 CYCLE 7
SV105_C7
B12:5
9

SV-105 CYCLE 8
SV105_C8
B12:6
3

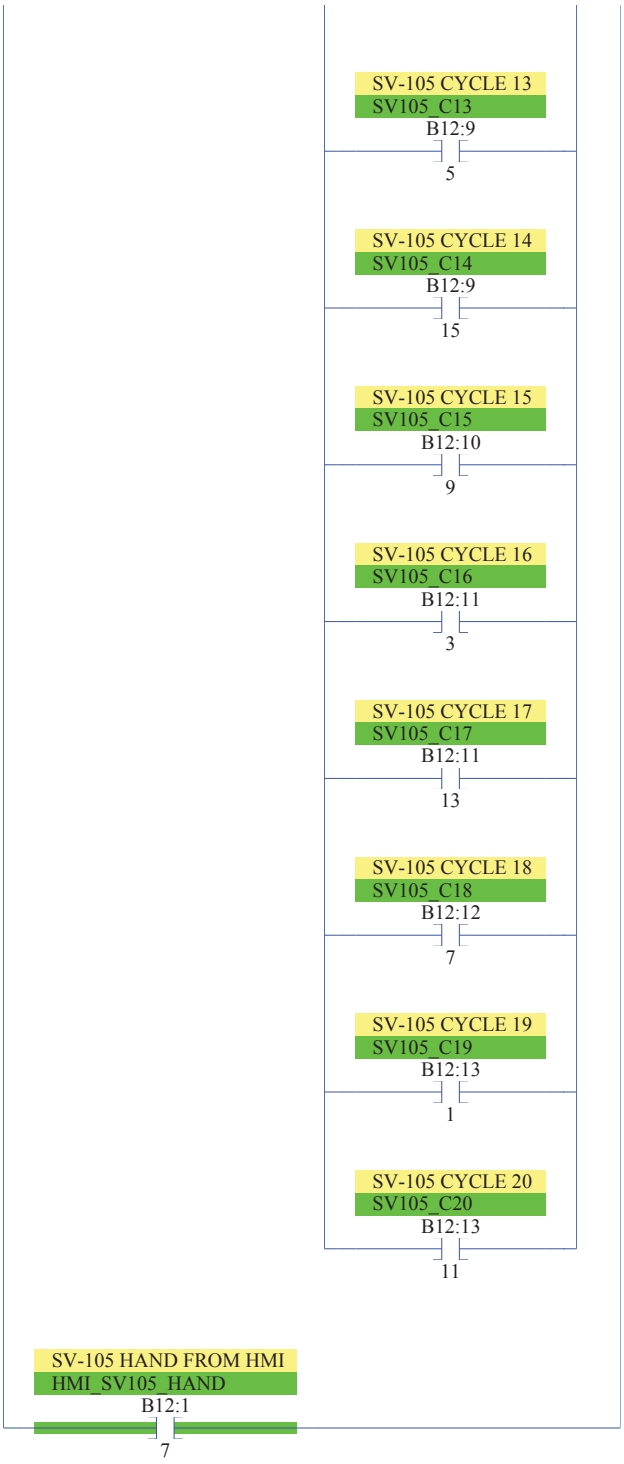
SV-105 CYCLE 9
SV105_C9
B12:6
13

SV-105 CYCLE 10
SV105_C10
B12:7
7

SV-105 CYCLE 11
SV105_C11
B12:8
1

SV-105 CYCLE 12
SV105_C12
B12:8
11

SOL VALVE SV-105
OUTPUT RAW
SV105_R
O:0
5
Bul.1766


SV-105 CYCLE 13
SV105_C13
B12:9
5
SV-105 CYCLE 14
SV105_C14
B12:9
15
SV-105 CYCLE 15
SV105_C15
B12:10
9
SV-105 CYCLE 16
SV105_C16
B12:11
3
SV-105 CYCLE 17
SV105_C17
B12:11
13
SV-105 CYCLE 18
SV105_C18
B12:12
7
SV-105 CYCLE 19
SV105_C19
B12:13
1
SV-105 CYCLE 20
SV105_C20
B12:13
11
SV-105 HAND FROM HMI
HMI_SV105_HAND
B12:1
7

SV-106

0006

ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
0

SV-106 AUTO FROM HMI
HMI_SV106_AUTO
B12:1
8

SV-106 CYCLE 1
SV106_C1
B12:2
8

SV-106 CYCLE 2
SV106_C2
B12:3
2

SV-106 CYCLE 3
SV106_C3
B12:14
6

SV-106 CYCLE 4
SV106_C4
B12:3
12

SV-106 CYCLE 5
SV106_C5
B12:4
6

SV-106 CYCLE 6
SV106_C6
B12:5
0

SV-106 CYCLE 7
SV106_C7
B12:5
10

SV-106 CYCLE 8
SV106_C8
B12:6
4

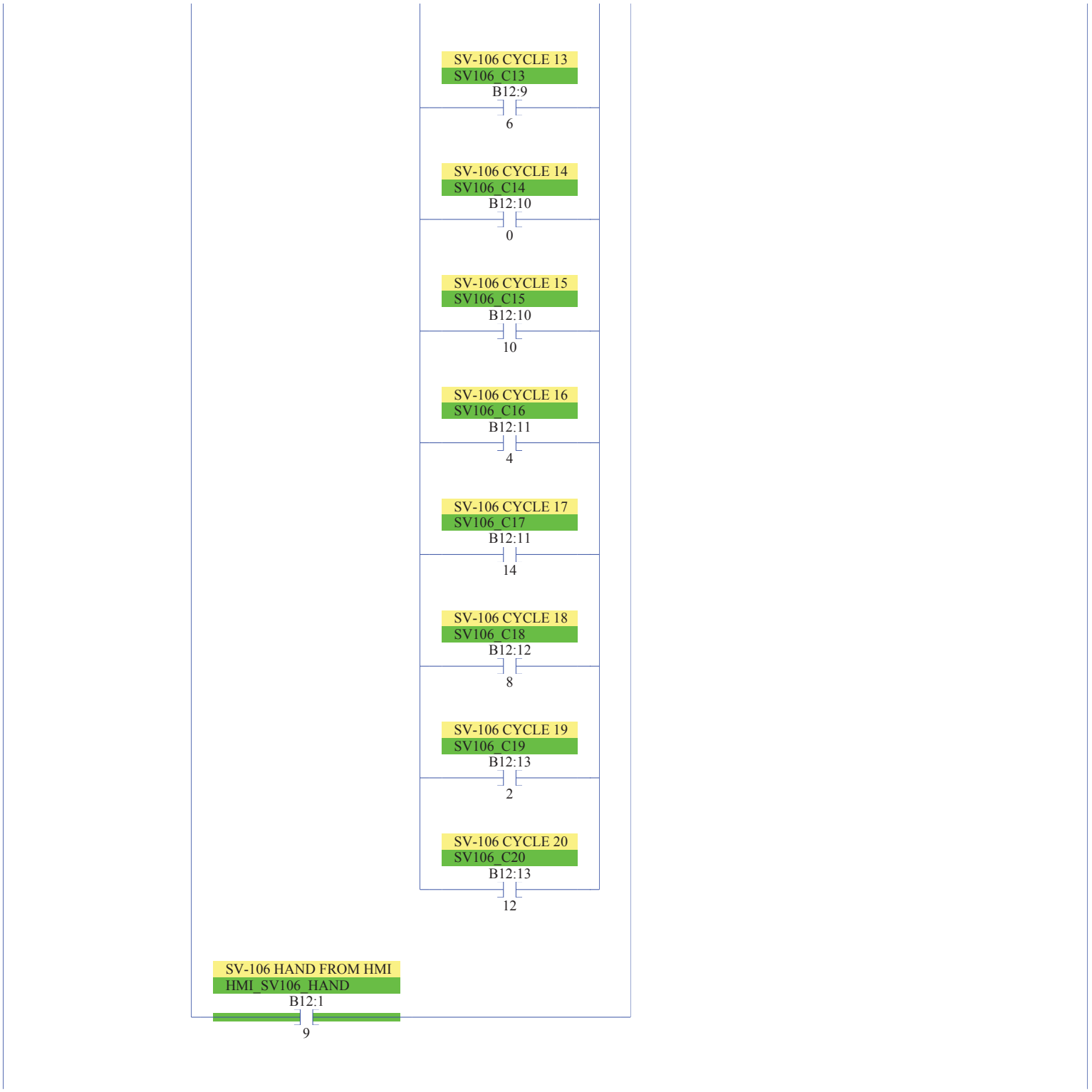
SV-106 CYCLE 9
SV106_C9
B12:6
14

SV-106 CYCLE 10
SV106_C10
B12:7
8

SV-106 CYCLE 11
SV106_C11
B12:8
2

SV-106 CYCLE 12
SV106_C12
B12:8
12

SOL VALVE SV-106
OUTPUT RAW
SV106_R
O:0
6
Bul.1766


SV-106 CYCLE 13
SV106_C13
B12:9
6
SV-106 CYCLE 14
SV106_C14
B12:10
0
SV-106 CYCLE 15
SV106_C15
B12:10
10
SV-106 CYCLE 16
SV106_C16
B12:11
4
SV-106 CYCLE 17
SV106_C17
B12:11
14
SV-106 CYCLE 18
SV106_C18
B12:12
8
SV-106 CYCLE 19
SV106_C19
B12:13
2
SV-106 CYCLE 20
SV106_C20
B12:13
12
SV-106 HAND FROM HMI
HMI_SV106_HAND
B12:1
9

SV-107

0007

ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
0

SV-107 AUTO FROM HMI
HMI_SV107_AUTO
B12:1
10

SV-107 CYCLE 1
SV107_C1
B12:2
9

SV-107 CYCLE 2
SV107_C2
B12:3
3

SV-107 CYCLE 3
SV107_C3
B12:14
7

SV-107 CYCLE 4
SV107_C4
B12:3
13

SV-107 CYCLE 5
SV107_C5
B12:4
7

SV-107 CYCLE 6
SV107_C6
B12:5
1

SV-107 CYCLE 7
SV107_C7
B12:5
11

SV-107 CYCLE 8
SV107_C8
B12:6
5

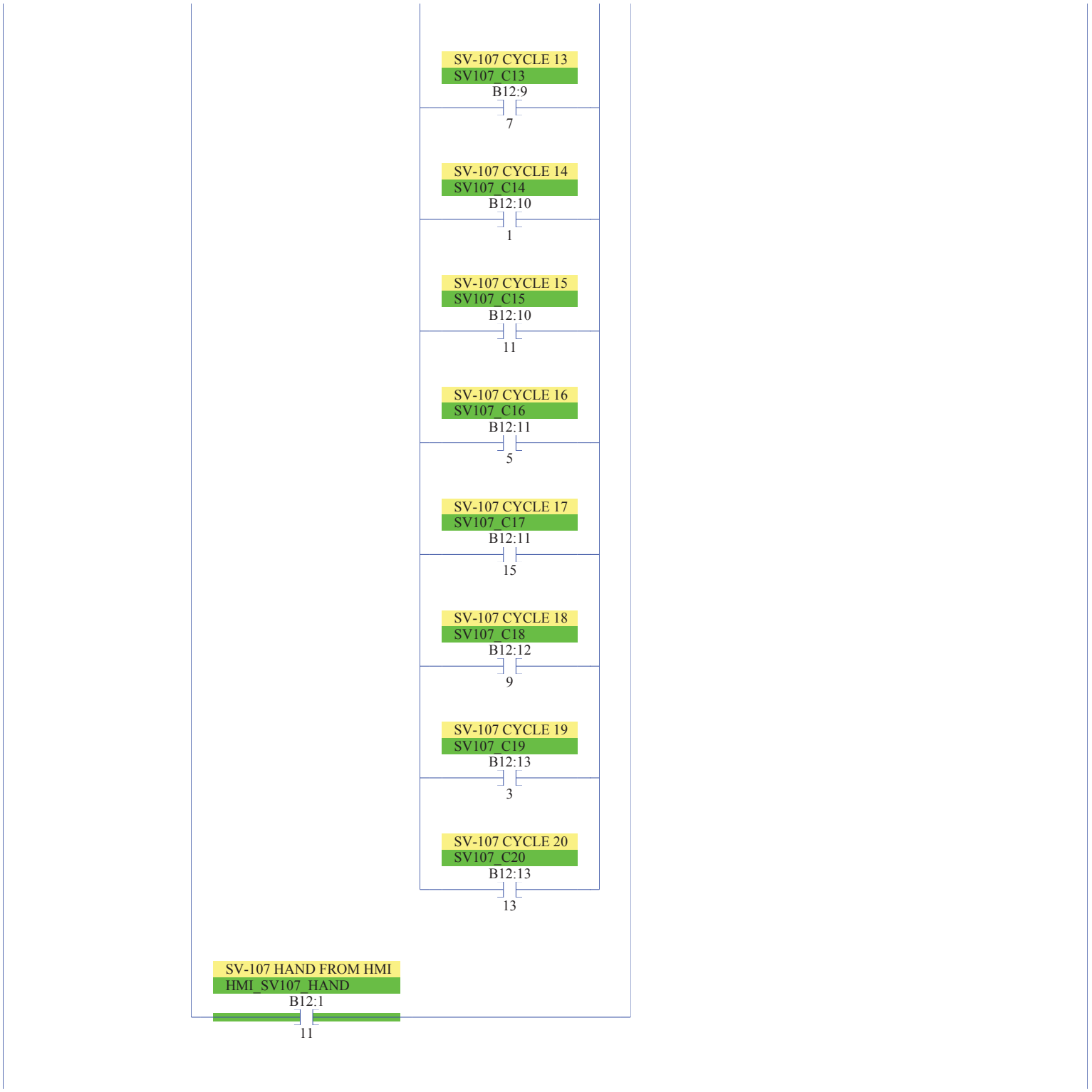
SV-107 CYCLE 9
SV107_C9
B12:6
15

SV-107 CYCLE 10
SV107_C10
B12:7
9

SV-107 CYCLE 11
SV107_C11
B12:8
3

SV-107 CYCLE 12
SV107_C12
B12:8
13

SOL VALVE SV-107
OUTPUT RAW
SV107_R
O:0
7
Bul.1766


SV-107 CYCLE 13
SV107_C13
B12:9
7
SV-107 CYCLE 14
SV107_C14
B12:10
1
SV-107 CYCLE 15
SV107_C15
B12:10
11
SV-107 CYCLE 16
SV107_C16
B12:11
5
SV-107 CYCLE 17
SV107_C17
B12:11
15
SV-107 CYCLE 18
SV107_C18
B12:12
9
SV-107 CYCLE 19
SV107_C19
B12:13
3
SV-107 CYCLE 20
SV107_C20
B12:13
13
SV-107 HAND FROM HMI
HMI_SV107_HAND
B12:1
11

SV-108

0008

ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
0

SV-108 AUTO FROM HMI
HMI_SV108_AUTO
B12:1
12

SV-108 CYCLE 1
SV108_C1
B12:2
10

SV-108 CYCLE 2
SV108_C2
B12:3
4

SV-108 CYCLE 3
SV108_C3
B12:14
8

SV-108 CYCLE 4
SV108_C4
B12:3
14

SV-108 CYCLE 5
SV108_C5
B12:4
8

SV-108 CYCLE 6
SV108_C6
B12:5
2

SV-108 CYCLE 7
SV108_C7
B12:5
12

SV-108 CYCLE 8
SV108_C8
B12:6
6

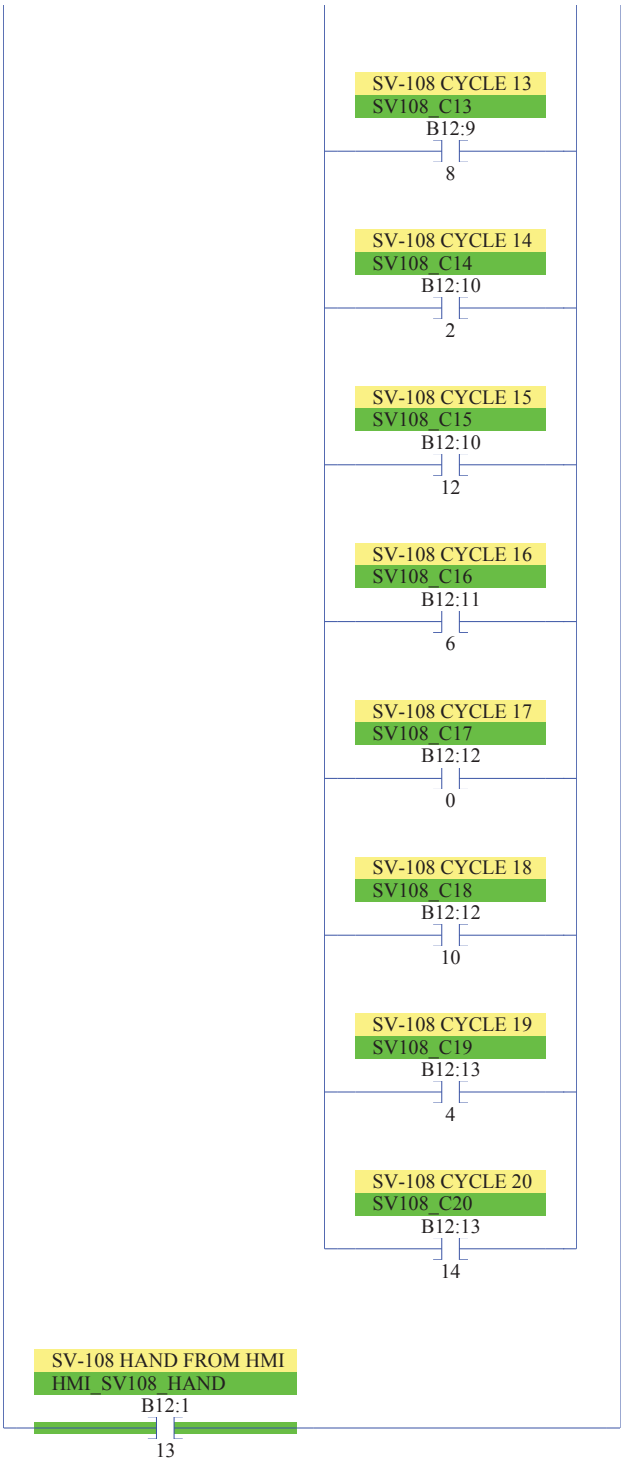
SV-108 CYCLE 9
SV108_C9
B12:7
0

SV-108 CYCLE 10
SV108_C10
B12:7
10

SV-108 CYCLE 11
SV108_C11
B12:8
4

SV-108 CYCLE 12
SV108_C12
B12:8
14

SOL VALVE SV-108
OUTPUT RAW
SV108_R
O:0
8
Bul.1766


SV-108 CYCLE 13
SV108_C13
B12:9
8
SV-108 CYCLE 14
SV108_C14
B12:10
2
SV-108 CYCLE 15
SV108_C15
B12:10
12
SV-108 CYCLE 16
SV108_C16
B12:11
6
SV-108 CYCLE 17
SV108_C17
B12:12
0
SV-108 CYCLE 18
SV108_C18
B12:12
10
SV-108 CYCLE 19
SV108_C19
B12:13
4
SV-108 CYCLE 20
SV108_C20
B12:13
14
SV-108 HAND FROM HMI
HMI_SV108_HAND
B12:1
13

SV-109

0009

ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
0

SV-109 AUTO FROM HMI
HMI_SV109_AUTO
B12:1
14

SV-109 CYCLE 1
SV109_C1
B12:2
11

SV-109 CYCLE 2
SV109_C2
B12:3
5

SV-109 CYCLE 3
SV109_C3
B12:14
9

SV-109 CYCLE 4
SV109_C4
B12:3
15

SV-109 CYCLE 5
SV109_C5
B12:4
9

SV-109 CYCLE 6
SV109_C6
B12:5
3

SV-109 CYCLE 7
SV109_C7
B12:5
13

SV-109 CYCLE 8
SV109_C8
B12:6
7

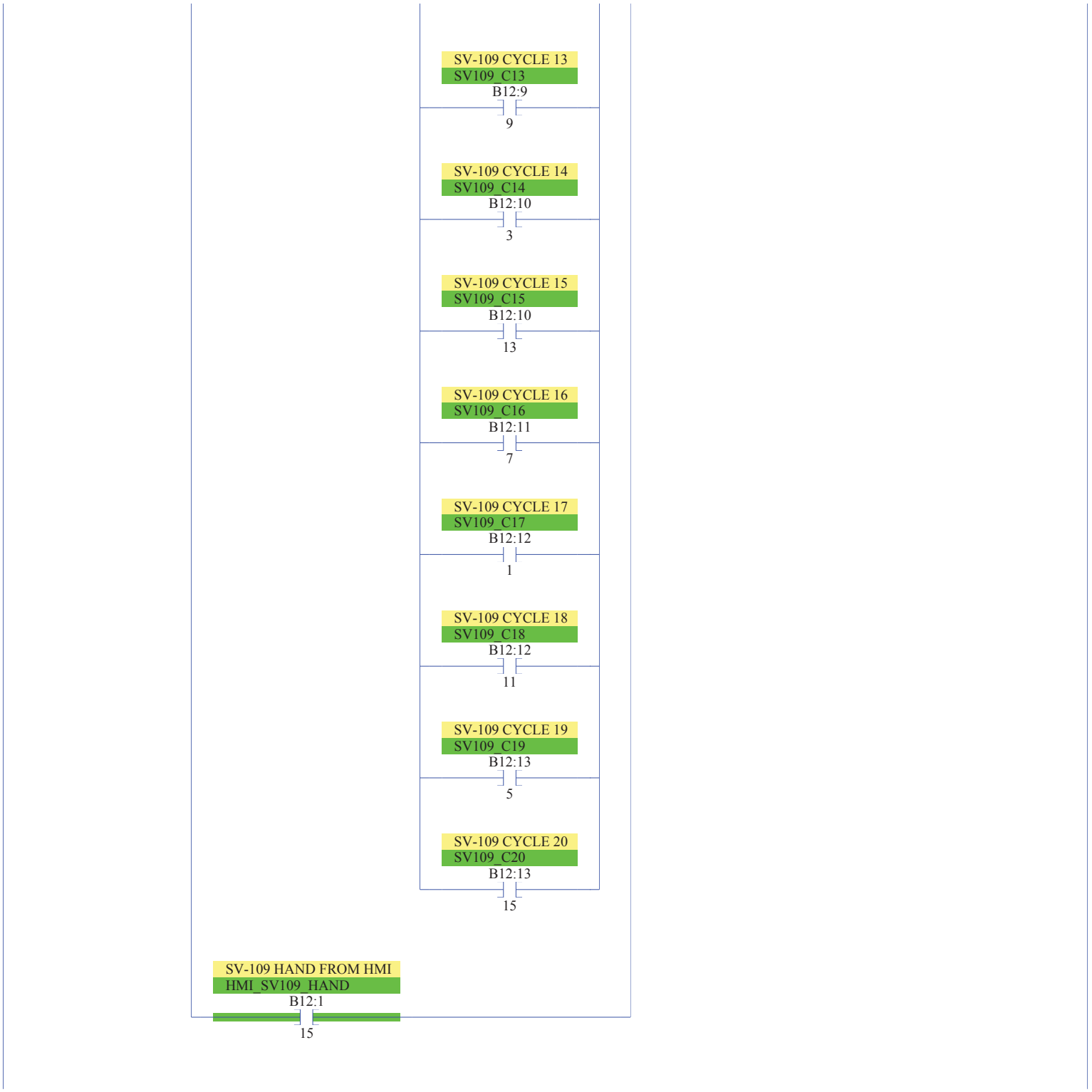
SV-109 CYCLE 9
SV109_C9
B12:7
1

SV-109 CYCLE 10
SV109_C10
B12:7
11

SV-109 CYCLE 11
SV109_C11
B12:8
5

SV-109 CYCLE 12
SV109_C12
B12:8
15

SOL VALVE SV-109
OUTPUT RAW
SV109_R
O:0
9
Bul.1766


SV-109 CYCLE 13
SV109_C13
B12:9
9
SV-109 CYCLE 14
SV109_C14
B12:10
3
SV-109 CYCLE 15
SV109_C15
B12:10
13
SV-109 CYCLE 16
SV109_C16
B12:11
7
SV-109 CYCLE 17
SV109_C17
B12:12
1
SV-109 CYCLE 18
SV109_C18
B12:12
11
SV-109 CYCLE 19
SV109_C19
B12:13
5
SV-109 CYCLE 20
SV109_C20
B12:13
15
SV-109 HAND FROM HMI
HMI_SV109_HAND
B12:1
15

SV-110

0010

ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
0

SV-110 AUTO FROM HMI
HMI_SV110_AUTO
B12:2
0

SV-110 CYCLE 1
SV110_C1
B12:2
12

SV-110 CYCLE 2
SV110_C2
B12:3
6

SV-110 CYCLE 3
SV110_C3
B12:14
10

SV-110 CYCLE 4
SV110_C4
B12:4
0

SV-110 CYCLE 5
SV110_C5
B12:4
10

SV-110 CYCLE 6
SV110_C6
B12:5
4

SV-110 CYCLE 7
SV110_C7
B12:5
14

SV-110 CYCLE 8
SV110_C8
B12:6
8

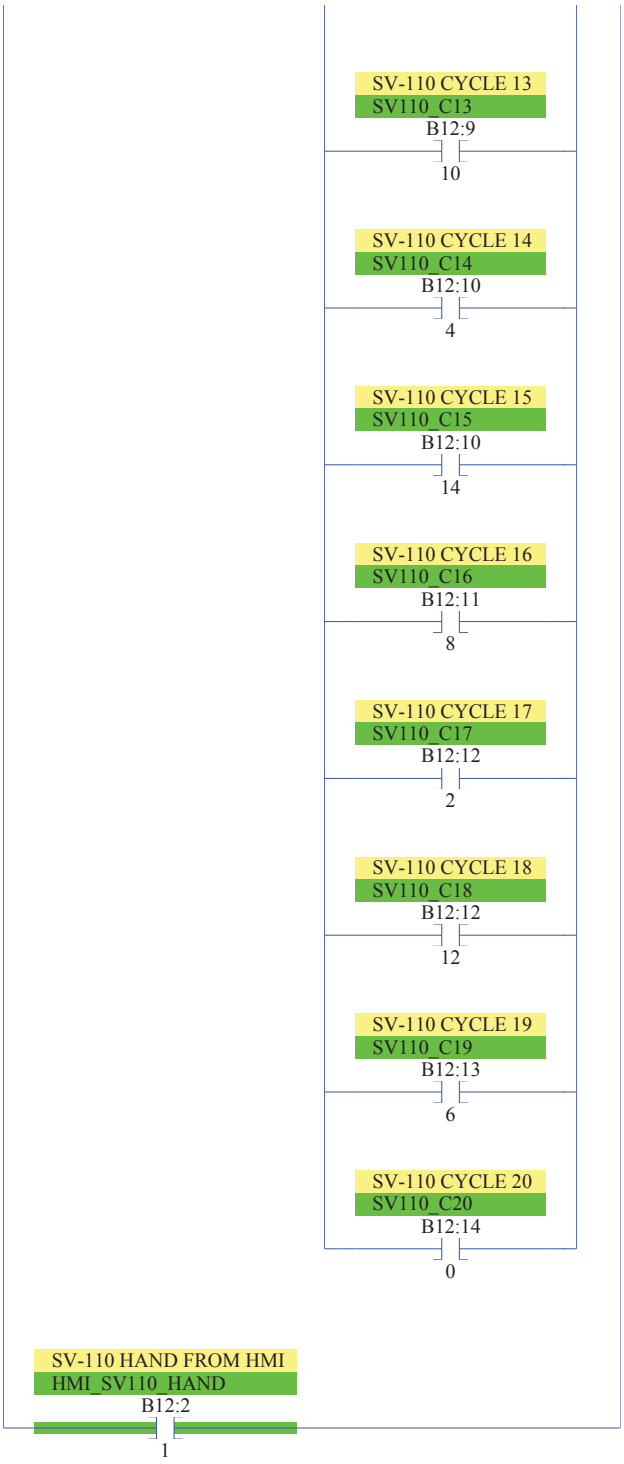
SV-110 CYCLE 9
SV110_C9
B12:7
2

SV-110 CYCLE 10
SV110_C10
B12:7
12

SV-110 CYCLE 11
SV110_C11
B12:8
6

SV-110 CYCLE 12
SV110_C12
B12:9
0

SOL VALVE SV-110
OUTPUT RAW
SV110_R
O:0
10
Bul.1766


SV-110 CYCLE 13
SV110_C13
B12:9
10
SV-110 CYCLE 14
SV110_C14
B12:10
4
SV-110 CYCLE 15
SV110_C15
B12:10
14
SV-110 CYCLE 16
SV110_C16
B12:11
8
SV-110 CYCLE 17
SV110_C17
B12:12
2
SV-110 CYCLE 18
SV110_C18
B12:12
12
SV-110 CYCLE 19
SV110_C19
B12:13
6
SV-110 CYCLE 20
SV110_C20
B12:14
0
SV-110 HAND FROM HMI
HMI_SV110_HAND
B12:2
1

SV-111

0011

ESTOP ACTIVE
YI_ESTOP_ACTIVE
B12:0
0

SV-111 AUTO FROM HMI
HMI_SV111_AUTO
B12:2
2

SV-111 CYCLE 1
SV111_C1
B12:2
13

SV-111 CYCLE 2
SV111_C2
B12:3
7

SV-111 CYCLE 3
SV111_C3
B12:14
11

SV-111 CYCLE 4
SV111_C4
B12:4
1

SV-111 CYCLE 5
SV111_C5
B12:4
11

SV-111 CYCLE 6
SV111_C6
B12:5
5

SV-111 CYCLE 7
SV111_C7
B12:5
15

SV-111 CYCLE 8
SV111_C8
B12:6
9

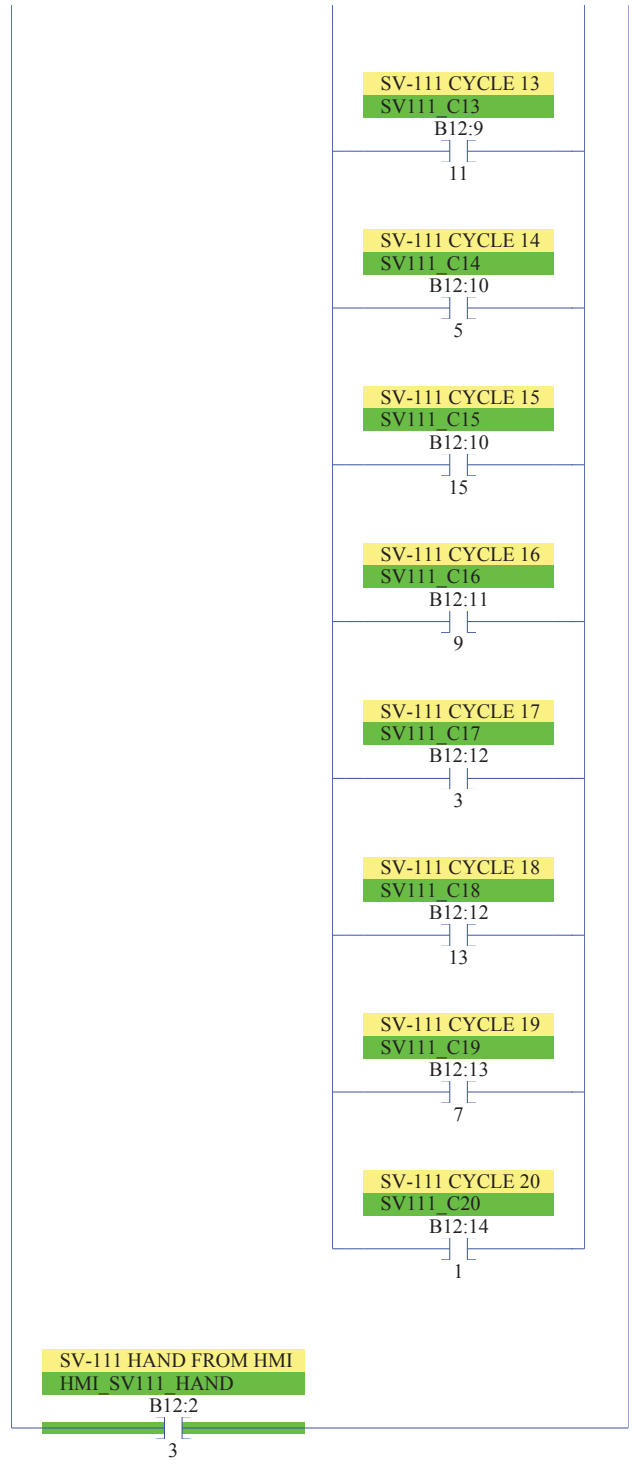
SV-111 CYCLE 9
SV111_C9
B12:7
3

SV-111 CYCLE 10
SV111_C10
B12:7
13

SV-111 CYCLE 11
SV111_C11
B12:8
7

SV-111 CYCLE 12
SV111_C12
B12:9
1

SOL VALVE SV-111
OUTPUT RAW
SV111_R
O:0
11
Bul.1766


SV-111 CYCLE 13
SV111_C13
B12:9
11
SV-111 CYCLE 14
SV111_C14
B12:10
5
SV-111 CYCLE 15
SV111_C15
B12:10
15
SV-111 CYCLE 16
SV111_C16
B12:11
9
SV-111 CYCLE 17
SV111_C17
B12:12
3
SV-111 CYCLE 18
SV111_C18
B12:12
13
SV-111 CYCLE 19
SV111_C19
B12:13
7
SV-111 CYCLE 20
SV111_C20
B12:14
1
SV-111 HAND FROM HMI
HMI_SV111_HAND
B12:2
3

0012 END

Data File O0 (bin) -- OUTPUT

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
O:0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
O:0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
O:0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
O:0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
O:0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
O:0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
O:1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:1.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:1.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:1.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:2.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:2.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:2.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:2.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:2.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:2.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:3.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:3.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:3.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:3.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:3.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:3.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:3.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:4.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:4.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:4.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:4.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:4.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:4.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
O:4.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20

Data File I1 (bin) -- INPUT

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
I:0.0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	Bul.1766 MicroLogix 1400 Series A
I:0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
I:0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
I:0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
I:0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
I:0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
I:0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
I:0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1766 MicroLogix 1400 Series A
I:1.0	0	0	0	1	1	0	1	1	1	1	0	1	0	0	1	0	OTHER - I/O Module - ID Code = 20
I:1.1	0	0	0	0	1	1	1	1	1	0	0	1	0	1	1	1	OTHER - I/O Module - ID Code = 20
I:1.2	0	0	0	1	1	0	1	0	0	1	0	0	0	1	1	0	OTHER - I/O Module - ID Code = 20
I:1.3	0	0	1	0	1	1	0	1	1	1	1	0	1	1	1	1	OTHER - I/O Module - ID Code = 20
I:1.4	0	0	0	1	1	0	1	1	0	1	0	0	1	0	1	0	OTHER - I/O Module - ID Code = 20
I:1.5	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	1	OTHER - I/O Module - ID Code = 20
I:1.6	0	0	0	0	1	1	1	1	1	0	0	0	1	1	0	0	OTHER - I/O Module - ID Code = 20
I:1.7	0	1	0	0	0	0	1	0	1	0	0	1	0	0	0	0	OTHER - I/O Module - ID Code = 20
I:2.0	0	0	0	0	1	1	1	1	0	1	1	0	0	1	0	0	OTHER - I/O Module - ID Code = 20
I:2.1	0	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0	OTHER - I/O Module - ID Code = 20
I:2.2	0	0	0	0	1	1	1	1	1	0	0	1	1	1	1	0	OTHER - I/O Module - ID Code = 20
I:2.3	0	0	0	0	1	1	1	1	1	0	0	1	0	1	1	1	OTHER - I/O Module - ID Code = 20
I:2.4	0	0	0	0	1	1	1	1	1	0	0	1	1	0	0	1	OTHER - I/O Module - ID Code = 20
I:2.5	0	0	0	0	1	1	1	1	1	0	0	1	1	0	1	0	OTHER - I/O Module - ID Code = 20
I:2.6	0	0	0	0	1	1	1	1	1	0	0	0	1	0	1	0	OTHER - I/O Module - ID Code = 20
I:2.7	0	0	0	0	1	1	1	1	1	0	0	0	1	0	1	1	OTHER - I/O Module - ID Code = 20
I:3.0	0	0	0	0	1	1	1	1	0	1	0	1	0	1	0	1	OTHER - I/O Module - ID Code = 20
I:3.1	0	0	0	0	1	1	1	1	1	0	0	0	1	0	1	1	OTHER - I/O Module - ID Code = 20
I:3.2	0	0	0	0	1	1	1	1	0	1	1	1	1	0	1	1	OTHER - I/O Module - ID Code = 20
I:3.3	0	0	0	0	1	1	1	1	0	1	1	1	1	0	1	0	OTHER - I/O Module - ID Code = 20
I:3.4	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
I:3.5	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0	OTHER - I/O Module - ID Code = 20
I:3.6	0	0	0	0	1	1	1	1	0	1	1	0	0	1	1	0	OTHER - I/O Module - ID Code = 20
I:3.7	0	0	0	0	1	1	1	1	1	0	0	1	0	1	0	1	OTHER - I/O Module - ID Code = 20
I:4.0	0	0	0	0	1	1	1	1	1	0	0	1	0	0	0	0	OTHER - I/O Module - ID Code = 20
I:4.1	0	0	0	0	1	1	1	1	1	0	0	1	0	0	0	1	OTHER - I/O Module - ID Code = 20
I:4.2	0	0	0	0	1	1	1	1	0	1	1	0	0	1	0	1	OTHER - I/O Module - ID Code = 20
I:4.3	0	0	0	0	1	1	1	1	1	0	0	1	0	0	1	0	OTHER - I/O Module - ID Code = 20
I:4.4	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	OTHER - I/O Module - ID Code = 20
I:4.5	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	OTHER - I/O Module - ID Code = 20
I:4.6	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	OTHER - I/O Module - ID Code = 20
I:4.7	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	OTHER - I/O Module - ID Code = 20

Main

Processor Mode S:1/0 - S:1/4 = Remote Run
On Power up Go To Run (Mode Behavior) S:1/12 = 0
First Pass S:1/15 = No
Free Running Clock S:4 = 0101-0100-0110-1011

Proc

OS Catalog Number S:57 = 1400 User Program Type S:63 = 9001h
OS Series S:58 = B Compiler Revision Number S:64 =
OS FRS S:59 =
Processor Catalog Number S:60 =
Processor Series S:61 = B
Processor FRN S:62 =

Scan Times

Maximum (x10 ms) S:22 = 60
Watchdog (x10 ms) S:3 (high byte) = 10
Last 100 uSec Scan Time S:35 = 33
Scan Toggle Bit S:33/9 = 0

Math

Math Overflow Selected S:2/14 = 0 Math Register (lo word) S:13 = 0
Overflow Trap S:5/0 = 0 Math Register (high word) S:14-S:13 = 0
Carry S:0/0 = 0 Math Register (32 Bit) S:14-S:13 = 0
Overflow S:0/1 = 0
Zero Bit S:0/2 = 1
Sign Bit S:0/3 = 0

Chan 0

Processor Mode S:1/0- S:1/4 = Remote Run
Node Address S:15 (low byte) = 0 Outgoing Msg Cmd Pending S:33/2 = 0
Baud Rate S:15 (high byte) = ?
Channel Mode S:33/3 = 0
Comms Active S:33/4 = 0
Incoming Cmd Pending S:33/0 = 0
Msg Reply Pending S:33/1 = 0

Debug

Suspend Code S:7 = 0
Suspend File S:8 = 0

Errors

Fault Override At Power Up S:1/8 = 0 Fault Routine S:29 = 0
Startup Protection Fault S:1/9 = 0 Major Error S:6 = 0h
Major Error Halt S:1/13 = 0
Overflow Trap S:5/0 = 0 Error Description:
Control Register Error S:5/2 = 0
Major Error Executing User Fault Rtn. S:5/3 = 0
Battery Low S:5/11 = 0
Input Filter Selection Modified S:5/13 = 0
ASCII String Manipulation error S:5/15 = 0

Protection

Deny Future Access S:1/14 = No
Data File Overwrite Protection Lost S:36/10 = False

Mem Module

Memory Module Loaded On Boot S:5/8 = 0
Password Mismatch S:5/9 = 0
Load Memory Module On Memory Error S:1/10 = 0
Load Memory Module Always S:1/11 = 0
On Power up Go To Run (Mode Behavior) S:1/12 = 0
Program Compare S:2/9 = 0
Data File Overwrite Protection Lost S:36/10 = 0

Forces

Forces Enabled S:1/5 = Yes
Forces Installed S:1/6 = No

Data File B3 (bin) -- BINARY

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	(Symbol) Description
B3:0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	

Data File T4 -- TIMER

Offset	EN	TT	DN	BASE	PRE	ACC	(Symbol) Description
T4:0	1	1	0	1.0 sec	3600	132	
T4:1	1	1	0	1.0 sec	360	163	
T4:2	1	1	0	1.0 sec	360	262	
T4:3	1	1	0	1.0 sec	360	238	
T4:4	1	1	0	1.0 sec	360	280	
T4:5	1	0	1	1.0 sec	500	500	
T4:6	0	0	0	.01 sec	0	0	
T4:7	0	0	0	.01 sec	0	0	
T4:8	0	0	0	.01 sec	0	0	
T4:9	0	0	0	.01 sec	0	0	
T4:10	0	0	0	.01 sec	0	0	
T4:11	0	0	0	.01 sec	0	0	
T4:12	0	0	0	.01 sec	0	0	
T4:13	0	0	0	.01 sec	0	0	
T4:14	0	0	0	.01 sec	0	0	
T4:15	0	0	0	.01 sec	0	0	
T4:16	0	0	0	.01 sec	0	0	
T4:17	0	0	0	.01 sec	0	0	
T4:18	0	0	0	.01 sec	0	0	
T4:19	0	0	0	.01 sec	0	0	
T4:20	0	0	0	1.0 sec	360	51	

Data File C5 -- COUNTER

Offset	CU	CD	DN	OV	UN	UA	PRE	ACC	(Symbol) Description
C5:0	0	0	1	0	0	0	0	5	
C5:1	0	0	1	0	0	0	0	5	
C5:2	0	0	1	0	0	0	0	4	
C5:3	0	0	1	0	0	0	0	2	
C5:4	0	0	1	0	0	0	0	8	
C5:5	0	0	0	0	0	0	0	0	
C5:6	0	0	0	0	0	0	0	0	
C5:7	0	0	0	0	0	0	0	0	
C5:8	0	0	0	0	0	0	0	0	
C5:9	0	0	0	0	0	0	0	0	

Data File R6 -- CONTROL

Offset	EN	EU	DN	EM	ER	UL	IN	FD	LEN	POS	(Symbol)	Description
R6:0	0	0	0	0	0	0	0	0	0	0		

Data File N7 (dec) -- INTEGER

Offset	0	1	2	3	4	5	6	7	8	9
N7:0	2075	2075	2075	2075	2075	2075	2075	2075	0	0
N7:10	0	0	0	0	0	0	0	0	0	0

Data File F8 -- FLT_SPT

Offset	0	1	2	3	4
F8:0	0	-5	0	0	0
F8:5	0	0	0	0	0
F8:10	15	51	0	0	0
F8:15	0	0	0	0	0
F8:20	50	50	0	0	0
F8:25	0	0	0	0	0
F8:30	50	51	0	0	0
F8:35	0	0	0	0	0
F8:40	15	50	0	0	0
F8:45	0	0	0	0	0
F8:50	50	0	0	0	0
F8:55	0	0	0	0	0

Data File N9 (dec) -- INT_SPT -- INTEGER SETPOINTS

Offset	0	1	2	3	4	5	6	7	8	9
N9:0	0	1	0	11	11	20	11	22	11	22
N9:10	11	24	11	24	11	26	11	27	11	28
N9:20	11	28	11	29	11	29	11	30	11	30
N9:30	11	31	11	31	11	32	11	32	11	33
N9:40	11	33	11	34	11	34	11	35	11	35
N9:50	11	36	11	36	11	37	11	37	11	38
N9:60	11	38	11	39	11	39	11	40	11	40
N9:70	11	41	11	41	11	42	11	42	11	43
N9:80	95	110	100	10	100	120	10	50	38	0
N9:90	38	0	38	0	38	0	38	0	38	0
N9:100	38	0	38	0	38	0	38	0	500	

Data File N10 (dec) -- INT_DISP -- INTEGERS FOR HMI DISPLAY

Offset	0	1	2	3	4	5	6	7	8	9
N10:0	100	0	95	66	100	66	85	23	97	96
N10:10	79	0	120	23	0	30	22	35	0	0
N10:20	100	0	28	0	0	0	0	0	0	0
N10:30	0	0	0	0	0	0	0	0	0	0
N10:40	0	0	0	0	0	0	0	0	0	0
N10:50	0	0	0	0	0	0	0	0	0	0

Data File F11 -- FLT_DISP -- FLOATING POINT REG. FOR HMI DISPLAY

Offset	0	1	2	3	4
F11:0	58.55625	0	51.16875	96.875	56.04375
F11:5	0	0	81.5	0	0
F11:10	0	0	0	0	0
F11:15	0	0	0	0	0
F11:20	0	0	0	0	0
F11:25	0	0	0	5.041945	976509.3
F11:30	2	0	781497.3	5	12149.93
F11:35	1380252	739158.2	238532.4	190853	409274.4
F11:40	0	0	0	0	0
F11:45	0	0	0	0	0
F11:50	0	0	0	0	0
F11:55	0	0	0	0	0
F11:60	20.00372	23.74922	26.91208	25.50636	20.46613
F11:65	0	0	0	0	0
F11:70	0	0	0	0	0
F11:75	0	0	0	0	0
F11:80	0	0	0	0	0
F11:85	0	0	0	0	0

Data File B12 (bin) -- BIT_DISP -- BIT LEVEL WORDS FOR HMI DISPLAY

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	(Symbol) Description
B12:0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	
B12:1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	
B12:2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	
B12:3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
B12:16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B12:24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Data File B13 (bin) -- BIT_CTRL -- CONTROL BITS

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	(Symbol) Description
B13:0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
B13:1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
B13:2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
B13:3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
B13:4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
B13:5	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
B13:6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
B13:7	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
B13:8	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
B13:9	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
B13:10	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
B13:11	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
B13:12	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
B13:13	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	
B13:14	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
B13:15	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
B13:16	0	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	
B13:17	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	
B13:18	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	
B13:19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B13:34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Data File B14 (bin) -- I_BITS -- INTERNAL BITS NOT FOR HMI DISPLAY

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	(Symbol) Description
B14:0	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	1	
B14:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
B14:2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
B14:3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
B14:4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
B14:5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B14:6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B14:7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B14:8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B14:9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Data File N15 (dec) -- I_INT -- INTERNAL INTEGERS NOT FOR HMI DISPLAY

Offset	0	1	2	3	4	5	6	7	8	9
N15:0	0	0	0	4014	1416	100	0	0	0	0
N15:10	0	0	0	4369	1684	79	0	0	0	0
N15:20	0	0	0	0	1908	100	0	0	0	0
N15:30	0	0	0	5461	1810	0	0	0	0	0
N15:40	0	0	0	4005	3352	0	0	0	0	0
N15:50	7517	0	10456	7011	1716	16383	16383	3818	15856	15724
N15:60	49	24	0	30	22	0	0	0	0	0
N15:70	0	0	0	0	0	0	0	0	0	0
N15:80	0	0	0	0	0	0	0	0	0	0
N15:90	0	0	0	0	0	0	0	0	0	0

Data File F16 -- I_FLTS -- INTERNAL FLOATS NOT FOR HMI DISPLAY

Offset	0	1	2	3	4
F16:0	0.8166667	0.4	0.08333334	0	0.3666667
F16:5	0	0	0	0	0
F16:10	9.996277	14.00043	9.996277	0	0
F16:15	20.99359	15.00146	24.99774	30.00293	20.00665
F16:20	4312	0	0	0	0
F16:25	0	0	0	0	0
F16:30	0	0	0	0	0
F16:35	0	0	0	0	0

Data File N17 (dec) -- PID_CTRL_1 -- PID CONTROL WORDS PID_010 - 021

Offset	0	1	2	3	4	5	6	7	8	9
N17:0	-32613	0	4096	30	10	0	0	16384	0	0
N17:10	0	100	0	2	0	4096	100	15155	21798	0
N17:20	-16	11978	4096	0	0	0	0	0	0	0
N17:30	-32741	0	2731	10	11	0	0	16384	0	0
N17:40	0	100	0	2	0	2731	100	16110	-10128	0
N17:50	0	12075	2731	0	0	0	0	0	0	0
N17:60	-24549	0	4096	30	10	0	0	16384	0	0
N17:70	0	100	0	2	0	4096	64	9228	-9436	0
N17:80	0	12236	4096	0	0	0	0	0	0	0
N17:90	-24557	0	4096	10	10	0	0	16384	0	0
N17:100	0	100	0	2	0	4096	43	6602	-18008	0
N17:110	0	12236	4096	0	0	0	0	0	0	0
N17:120	-32741	0	2731	12	13	0	0	16384	0	0
N17:130	0	100	0	2	0	2731	10	1389	-14240	0
N17:140	0	12365	2731	0	0	0	0	0	0	0
N17:150	-32741	0	2731	15	16	0	0	16384	0	0
N17:160	0	100	0	2	0	2731	100	15974	-16842	0
N17:170	0	12462	2731	0	0	0	0	0	0	0
N17:180	-24549	0	4096	17	18	0	0	16384	0	0
N17:190	0	100	0	2	0	4096	100	15687	7010	0
N17:200	0	12591	4096	0	0	0	0	0	0	0
N17:210	-24549	0	4096	19	20	0	0	16384	0	0
N17:220	0	100	0	2	0	4096	23	3040	773	0
N17:230	0	12591	4096	0	0	0	0	0	0	0
N17:240	0	0	0	0	0	0	0	0	0	0

Data File T18 -- ALA_TMRS

Offset	EN	TT	DN	BASE	PRE	ACC	(Symbol) Description
T18:0	0	0	0	1.0 sec	10	0	
T18:1	0	0	0	1.0 sec	10	0	
T18:2	0	0	0	1.0 sec	30	0	
T18:3	1	0	1	1.0 sec	60	60	
T18:4	0	0	0	1.0 sec	5	0	
T18:5	0	0	0	1.0 sec	5	0	
T18:6	0	0	0	1.0 sec	60	0	
T18:7	1	0	1	1.0 sec	30	30	
T18:8	0	0	0	1.0 sec	10	0	
T18:9	0	0	0	1.0 sec	10	0	
T18:10	0	0	0	1.0 sec	10	0	
T18:11	0	0	0	1.0 sec	10	0	
T18:12	0	0	0	1.0 sec	10	0	
T18:13	0	0	0	1.0 sec	10	0	
T18:14	0	0	0	1.0 sec	10	0	
T18:15	0	0	0	1.0 sec	10	0	
T18:16	0	0	0	1.0 sec	10	0	
T18:17	0	0	0	1.0 sec	10	0	
T18:18	0	0	0	1.0 sec	10	0	
T18:19	0	0	0	1.0 sec	10	0	
T18:20	0	0	0	1.0 sec	10	0	
T18:21	0	0	0	1.0 sec	10	0	
T18:22	0	0	0	1.0 sec	10	0	
T18:23	0	0	0	1.0 sec	10	0	
T18:24	0	0	0	1.0 sec	10	0	
T18:25	0	0	0	1.0 sec	10	0	
T18:26	0	0	0	1.0 sec	30	0	
T18:27	0	0	0	1.0 sec	10	0	
T18:28	0	0	0	1.0 sec	10	0	
T18:29	0	0	0	.01 sec	0	0	
T18:30	0	0	0	.01 sec	0	0	
T18:31	0	0	0	.01 sec	0	0	
T18:32	0	0	0	.01 sec	0	0	
T18:33	0	0	0	.01 sec	0	0	
T18:34	0	0	0	.01 sec	0	0	
T18:35	0	0	0	.01 sec	0	0	
T18:36	0	0	0	.01 sec	0	0	
T18:37	0	0	0	.01 sec	0	0	
T18:38	0	0	0	.01 sec	0	0	
T18:39	0	0	0	.01 sec	0	0	

Data File T19 -- CTRL_TMRS

Offset	EN	TT	DN	BASE	PRE	ACC	(Symbol) Description
T19:0	1	0	1	.01 sec	50	50	
T19:1	1	1	0	.01 sec	50	2	
T19:2	1	1	0	1.0 sec	32767	28805	
T19:3	0	0	0	.01 sec	1	0	
T19:4	0	0	0	1.0 sec	3720	0	
T19:5	0	0	0	1.0 sec	7200	0	
T19:6	0	0	0	1.0 sec	3720	0	
T19:7	0	0	0	1.0 sec	7200	0	
T19:8	1	1	0	1.0 sec	16384	7198	
T19:9	0	0	0	.01 sec	0	0	
T19:10	0	0	0	1.0 sec	1	0	
T19:11	0	0	0	1.0 sec	1	0	
T19:12	0	0	0	1.0 sec	1	0	
T19:13	0	0	0	1.0 sec	1	0	
T19:14	0	0	0	1.0 sec	1	0	
T19:15	0	0	0	1.0 sec	1	0	
T19:16	0	0	0	1.0 sec	1	0	
T19:17	0	0	0	1.0 sec	1	0	
T19:18	0	0	0	1.0 sec	1	0	
T19:19	0	0	0	1.0 sec	1	0	
T19:20	0	0	0	1.0 sec	1	0	
T19:21	0	0	0	1.0 sec	1	0	
T19:22	0	0	0	1.0 sec	1	0	
T19:23	0	0	0	1.0 sec	1	0	
T19:24	1	1	0	1.0 sec	2	1	
T19:25	0	0	0	1.0 sec	1	0	
T19:26	0	0	0	.01 sec	0	0	
T19:27	0	0	0	.01 sec	0	0	
T19:28	0	0	0	.01 sec	0	0	
T19:29	0	0	0	.01 sec	0	0	
T19:30	0	0	0	.01 sec	0	0	
T19:31	0	0	0	.01 sec	0	0	
T19:32	0	0	0	.01 sec	0	0	
T19:33	0	0	0	.01 sec	0	0	
T19:34	0	0	0	.01 sec	0	0	
T19:35	0	0	0	.01 sec	0	0	
T19:36	0	0	0	.01 sec	0	0	
T19:37	0	0	0	.01 sec	0	0	
T19:38	0	0	0	.01 sec	0	0	
T19:39	0	0	0	.01 sec	0	0	
T19:40	0	0	0	.01 sec	0	0	
T19:41	0	0	0	.01 sec	0	0	
T19:42	0	0	0	.01 sec	0	0	
T19:43	0	0	0	.01 sec	0	0	
T19:44	0	0	0	.01 sec	0	0	
T19:45	0	0	0	.01 sec	0	0	
T19:46	0	0	0	.01 sec	0	0	
T19:47	0	0	0	.01 sec	0	0	
T19:48	0	0	0	.01 sec	0	0	
T19:49	0	0	0	.01 sec	0	0	
T19:50	0	0	0	.01 sec	0	0	
T19:51	0	0	0	.01 sec	0	0	
T19:52	0	0	0	.01 sec	0	0	
T19:53	0	0	0	.01 sec	0	0	
T19:54	0	0	0	.01 sec	0	0	
T19:55	0	0	0	.01 sec	0	0	
T19:56	0	0	0	.01 sec	0	0	
T19:57	0	0	0	.01 sec	0	0	
T19:58	0	0	0	.01 sec	0	0	
T19:59	0	0	0	.01 sec	0	0	

Data File N20 (dec) -- REM_OUT -- REMOTE DATA TO MASTER

Offset	0	1	2	3	4	5	6	7	8	9
N20:0	29893	8401	12756	100	22730	8819	13079	79	31179	9159
N20:10	6258	100	22695	9008	14320	0	27532	8462	12359	0
N20:20	-26215	9	28806	12757	0	0	0	0	0	0
N20:30	0	0	0	0	0	0	0	0	0	0

Data File N21 (dec) -- REM_IN -- REMOTE DATA FROM MASTER

Offset	0	1	2	3	4	5	6	7	8	9
N21:0	95	709	59	10	1	0	1489	0	0	0
N21:10	100	993	25	15	5	0	1064	0	0	0
N21:20	90	709	21	10	5	0	1773	10	10	0
N21:30	66	0	25	1	1	0	2128	10	10	0
N21:40	85	0	21	10	1	0	1419	10	10	0
N21:50	7517	60	4657	3	0	0	0	0	0	0

Data File PD22 -- PID_CTRL_W -- PID CONTROL WORDS

Offset	TM	AM	CM	OL	RG	SC	TF	DA	DB	UL	LL	SP	PV	DN	EN	SPS	KC	Ti	TD	MAXS	MINS	ZCD	CVH	CVL	LUT	SPV
PD22:0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4833	10	1	0	16384	0	0	100	0	6	0
PD22:1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1489	0	0	0	16384	0	0	100	0	5	0
PD22:2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4551	15	5	0	16384	0	0	100	0	7	0
PD22:3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1064	0	0	0	16384	0	0	100	0	7	0
PD22:4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3823	10	5	0	16384	0	0	100	0	14	0
PD22:5	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1773	10	10	0	16384	0	0	100	0	10	0
PD22:6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4551	1	1	0	16384	0	0	100	0	9	0
PD22:7	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2128	10	10	0	16384	0	0	100	0	6	0
PD22:8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3823	10	1	0	16384	0	0	100	0	7	0
PD22:9	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3278	10	10	0	16384	0	0	100	0	6	0
PD22:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PD22:11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PD22:12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PD22:13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PD22:14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PD22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PD22:16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PD22:17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PD22:18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PD22:19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Address (Symbol) = Value [Description]

Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
B12:0/0	YI_ESTOP_ACTIVE	Global	ESTOP ACTIVE				
B12:0/1	YI_PHAMON_ALARM	Global	PHASE MONITOR ALARM				
B12:0/2	COND_SEP_HH_ALARM	Global	CONDENSATE SEP HI HI ALARM				
B12:0/3	AS_COMP_RUNNING	Global	AIR SPARGE COMPRESSOR RUN STATUS				
B12:0/4	AIR_COMP_LOADED	Global	AIR SPARGE COMPRESSOR LOADED STATUS				
B12:0/5	AIR_COMP_WARN_STATUS	Global	AIR SPARGE COMPRESSOR WARNING STATUS				
B12:0/6	AIR_COMP_ALRM_STATUS	Global	AIR SPARGE COMPRESSOR ALARM STATUS				
B12:1/0	HMI_SV102_AUTO	Global	SV-102 AUTO FROM HMI				
B12:1/1	HMI_SV102_HAND	Global	SV-102 HAND FROM HMI				
B12:1/2	HMI_SV103_AUTO	Global	SV-103 AUTO FROM HMI				
B12:1/3	HMI_SV103_HAND	Global	SV-103 HAND FROM HMI				
B12:1/4	HMI_SV104_AUTO	Global	SV-104 AUTO FROM HMI				
B12:1/5	HMI_SV104_HAND	Global	SV-104 HAND FROM HMI				
B12:1/6	HMI_SV105_AUTO	Global	SV-105 AUTO FROM HMI				
B12:1/7	HMI_SV105_HAND	Global	SV-105 HAND FROM HMI				
B12:1/8	HMI_SV106_AUTO	Global	SV-106 AUTO FROM HMI				
B12:1/9	HMI_SV106_HAND	Global	SV-106 HAND FROM HMI				
B12:1/10	HMI_SV107_AUTO	Global	SV-107 AUTO FROM HMI				
B12:1/11	HMI_SV107_HAND	Global	SV-107 HAND FROM HMI				
B12:1/12	HMI_SV108_AUTO	Global	SV-108 AUTO FROM HMI				
B12:1/13	HMI_SV108_HAND	Global	SV-108 HAND FROM HMI				
B12:1/14	HMI_SV109_AUTO	Global	SV-109 AUTO FROM HMI				
B12:1/15	HMI_SV109_HAND	Global	SV-109 HAND FROM HMI				
B12:2/0	HMI_SV110_AUTO	Global	SV-110 AUTO FROM HMI				
B12:2/1	HMI_SV110_HAND	Global	SV-110 HAND FROM HMI				
B12:2/2	HMI_SV111_AUTO	Global	SV-111 AUTO FROM HMI				
B12:2/3	HMI_SV111_HAND	Global	SV-111 HAND FROM HMI				
B12:2/4	SV102_C1	Global	SV-102 CYCLE 1				
B12:2/5	SV103_C1	Global	SV-103 CYCLE 1				
B12:2/6	SV104_C1	Global	SV-104 CYCLE 1				
B12:2/7	SV105_C1	Global	SV-105 CYCLE 1				
B12:2/8	SV106_C1	Global	SV-106 CYCLE 1				
B12:2/9	SV107_C1	Global	SV-107 CYCLE 1				
B12:2/10	SV108_C1	Global	SV-108 CYCLE 1				
B12:2/11	SV109_C1	Global	SV-109 CYCLE 1				
B12:2/12	SV110_C1	Global	SV-110 CYCLE 1				
B12:2/13	SV111_C1	Global	SV-111 CYCLE 1				
B12:2/14	SV102_C2	Global	SV-102 CYCLE 2				
B12:2/15	SV103_C2	Global	SV-103 CYCLE 2				
B12:3/0	SV104_C2	Global	SV-104 CYCLE 2				
B12:3/1	SV105_C2	Global	SV-105 CYCLE 2				
B12:3/2	SV106_C2	Global	SV-106 CYCLE 2				
B12:3/3	SV107_C2	Global	SV-107 CYCLE 2				
B12:3/4	SV108_C2	Global	SV-108 CYCLE 2				
B12:3/5	SV109_C2	Global	SV-109 CYCLE 2				
B12:3/6	SV110_C2	Global	SV-110 CYCLE 2				
B12:3/7	SV111_C2	Global	SV-111 CYCLE 2				
B12:3/8	SV102_C4	Global	SV-102 CYCLE 4				
B12:3/9	SV103_C4	Global	SV-103 CYCLE 4				
B12:3/10	SV104_C4	Global	SV-104 CYCLE 4				
B12:3/11	SV105_C4	Global	SV-105 CYCLE 4				
B12:3/12	SV106_C4	Global	SV-106 CYCLE 4				
B12:3/13	SV107_C4	Global	SV-107 CYCLE 4				
B12:3/14	SV108_C4	Global	SV-108 CYCLE 4				
B12:3/15	SV109_C4	Global	SV-109 CYCLE 4				
B12:4/0	SV110_C4	Global	SV-110 CYCLE 4				
B12:4/1	SV111_C4	Global	SV-111 CYCLE 4				
B12:4/2	SV102_C5	Global	SV-102 CYCLE 5				
B12:4/3	SV103_C5	Global	SV-103 CYCLE 5				
B12:4/4	SV104_C5	Global	SV-104 CYCLE 5				
B12:4/5	SV105_C5	Global	SV-105 CYCLE 5				
B12:4/6	SV106_C5	Global	SV-106 CYCLE 5				
B12:4/7	SV107_C5	Global	SV-107 CYCLE 5				
B12:4/8	SV108_C5	Global	SV-108 CYCLE 5				
B12:4/9	SV109_C5	Global	SV-109 CYCLE 5				
B12:4/10	SV110_C5	Global	SV-110 CYCLE 5				
B12:4/11	SV111_C5	Global	SV-111 CYCLE 5				
B12:4/12	SV102_C6	Global	SV-102 CYCLE 6				
B12:4/13	SV103_C6	Global	SV-103 CYCLE 6				
B12:4/14	SV104_C6	Global	SV-104 CYCLE 6				
B12:4/15	SV105_C6	Global	SV-105 CYCLE 6				
B12:5/0	SV106_C6	Global	SV-106 CYCLE 6				
B12:5/1	SV107_C6	Global	SV-107 CYCLE 6				
B12:5/2	SV108_C6	Global	SV-108 CYCLE 6				
B12:5/3	SV109_C6	Global	SV-109 CYCLE 6				
B12:5/4	SV110_C6	Global	SV-110 CYCLE 6				
B12:5/5	SV111_C6	Global	SV-111 CYCLE 6				
B12:5/6	SV102_C7	Global	SV-102 CYCLE 7				
B12:5/7	SV103_C7	Global	SV-103 CYCLE 7				
B12:5/8	SV104_C7	Global	SV-104 CYCLE 7				
B12:5/9	SV105_C7	Global	SV-105 CYCLE 7				
B12:5/10	SV106_C7	Global	SV-106 CYCLE 7				
B12:5/11	SV107_C7	Global	SV-107 CYCLE 7				
B12:5/12	SV108_C7	Global	SV-108 CYCLE 7				
B12:5/13	SV109_C7	Global	SV-109 CYCLE 7				
B12:5/14	SV110_C7	Global	SV-110 CYCLE 7				
B12:5/15	SV111_C7	Global	SV-111 CYCLE 7				
B12:6/0	SV102_C8	Global	SV-102 CYCLE 8				
B12:6/1	SV103_C8	Global	SV-103 CYCLE 8				
B12:6/2	SV104_C8	Global	SV-104 CYCLE 8				
B12:6/3	SV105_C8	Global	SV-105 CYCLE 8				
B12:6/4	SV106_C8	Global	SV-106 CYCLE 8				
B12:6/5	SV107_C8	Global	SV-107 CYCLE 8				
B12:6/6	SV108_C8	Global	SV-108 CYCLE 8				
B12:6/7	SV109_C8	Global	SV-109 CYCLE 8				
B12:6/8	SV110_C8	Global	SV-110 CYCLE 8				
B12:6/9	SV111_C8	Global	SV-111 CYCLE 8				
B12:6/10	SV102_C9	Global	SV-102 CYCLE 9				
B12:6/11	SV103_C9	Global	SV-103 CYCLE 9				
B12:6/12	SV104_C9	Global	SV-104 CYCLE 9				
B12:6/13	SV105_C9	Global	SV-105 CYCLE 9				
B12:6/14	SV106_C9	Global	SV-106 CYCLE 9				
B12:6/15	SV107_C9	Global	SV-107 CYCLE 9				
B12:7/0	SV108_C9	Global	SV-108 CYCLE 9				
B12:7/1	SV109_C9	Global	SV-109 CYCLE 9				
B12:7/2	SV110_C9	Global	SV-110 CYCLE 9				
B12:7/3	SV111_C9	Global	SV-111 CYCLE 9				
B12:7/4	SV102_C10	Global	SV-102 CYCLE 10				
B12:7/5	SV103_C10	Global	SV-103 CYCLE 10				

Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
B12:7/6	SV104_C10	Global	SV-104 CYCLE 10				
B12:7/7	SV105_C10	Global	SV-105 CYCLE 10				
B12:7/8	SV106_C10	Global	SV-106 CYCLE 10				
B12:7/9	SV107_C10	Global	SV-107 CYCLE 10				
B12:7/10	SV108_C10	Global	SV-108 CYCLE 10				
B12:7/11	SV109_C10	Global	SV-109 CYCLE 10				
B12:7/12	SV110_C10	Global	SV-110 CYCLE 10				
B12:7/13	SV111_C10	Global	SV-111 CYCLE 10				
B12:7/14	SV102_C11	Global	SV-102 CYCLE 11				
B12:7/15	SV103_C11	Global	SV-103 CYCLE 11				
B12:8/0	SV104_C11	Global	SV-104 CYCLE 11				
B12:8/1	SV105_C11	Global	SV-105 CYCLE 11				
B12:8/2	SV106_C11	Global	SV-106 CYCLE 11				
B12:8/3	SV107_C11	Global	SV-107 CYCLE 11				
B12:8/4	SV108_C11	Global	SV-108 CYCLE 11				
B12:8/5	SV109_C11	Global	SV-109 CYCLE 11				
B12:8/6	SV110_C11	Global	SV-110 CYCLE 11				
B12:8/7	SV111_C11	Global	SV-111 CYCLE 11				
B12:8/8	SV102_C12	Global	SV-102 CYCLE 12				
B12:8/9	SV103_C12	Global	SV-103 CYCLE 12				
B12:8/10	SV104_C12	Global	SV-104 CYCLE 12				
B12:8/11	SV105_C12	Global	SV-105 CYCLE 12				
B12:8/12	SV106_C12	Global	SV-106 CYCLE 12				
B12:8/13	SV107_C12	Global	SV-107 CYCLE 12				
B12:8/14	SV108_C12	Global	SV-108 CYCLE 12				
B12:8/15	SV109_C12	Global	SV-109 CYCLE 12				
B12:9/0	SV110_C12	Global	SV-110 CYCLE 12				
B12:9/1	SV111_C12	Global	SV-111 CYCLE 12				
B12:9/2	SV102_C13	Global	SV-102 CYCLE 13				
B12:9/3	SV103_C13	Global	SV-103 CYCLE 13				
B12:9/4	SV104_C13	Global	SV-104 CYCLE 13				
B12:9/5	SV105_C13	Global	SV-105 CYCLE 13				
B12:9/6	SV106_C13	Global	SV-106 CYCLE 13				
B12:9/7	SV107_C13	Global	SV-107 CYCLE 13				
B12:9/8	SV108_C13	Global	SV-108 CYCLE 13				
B12:9/9	SV109_C13	Global	SV-109 CYCLE 13				
B12:9/10	SV110_C13	Global	SV-110 CYCLE 13				
B12:9/11	SV111_C13	Global	SV-111 CYCLE 13				
B12:9/12	SV102_C14	Global	SV-102 CYCLE 14				
B12:9/13	SV103_C14	Global	SV-103 CYCLE 14				
B12:9/14	SV104_C14	Global	SV-104 CYCLE 14				
B12:9/15	SV105_C14	Global	SV-105 CYCLE 14				
B12:10/0	SV106_C14	Global	SV-106 CYCLE 14				
B12:10/1	SV107_C14	Global	SV-107 CYCLE 14				
B12:10/2	SV108_C14	Global	SV-108 CYCLE 14				
B12:10/3	SV109_C14	Global	SV-109 CYCLE 14				
B12:10/4	SV110_C14	Global	SV-110 CYCLE 14				
B12:10/5	SV111_C14	Global	SV-111 CYCLE 14				
B12:10/6	SV102_C15	Global	SV-102 CYCLE 15				
B12:10/7	SV103_C15	Global	SV-103 CYCLE 15				
B12:10/8	SV104_C15	Global	SV-104 CYCLE 15				
B12:10/9	SV105_C15	Global	SV-105 CYCLE 15				
B12:10/10	SV106_C15	Global	SV-106 CYCLE 15				
B12:10/11	SV107_C15	Global	SV-107 CYCLE 15				
B12:10/12	SV108_C15	Global	SV-108 CYCLE 15				
B12:10/13	SV109_C15	Global	SV-109 CYCLE 15				
B12:10/14	SV110_C15	Global	SV-110 CYCLE 15				
B12:10/15	SV111_C15	Global	SV-111 CYCLE 15				
B12:11/0	SV102_C16	Global	SV-102 CYCLE 16				
B12:11/1	SV103_C16	Global	SV-103 CYCLE 16				
B12:11/2	SV104_C16	Global	SV-104 CYCLE 16				
B12:11/3	SV105_C16	Global	SV-105 CYCLE 16				
B12:11/4	SV106_C16	Global	SV-106 CYCLE 16				
B12:11/5	SV107_C16	Global	SV-107 CYCLE 16				
B12:11/6	SV108_C16	Global	SV-108 CYCLE 16				
B12:11/7	SV109_C16	Global	SV-109 CYCLE 16				
B12:11/8	SV110_C16	Global	SV-110 CYCLE 16				
B12:11/9	SV111_C16	Global	SV-111 CYCLE 16				
B12:11/10	SV102_C17	Global	SV-102 CYCLE 17				
B12:11/11	SV103_C17	Global	SV-103 CYCLE 17				
B12:11/12	SV104_C17	Global	SV-104 CYCLE 17				
B12:11/13	SV105_C17	Global	SV-105 CYCLE 17				
B12:11/14	SV106_C17	Global	SV-106 CYCLE 17				
B12:11/15	SV107_C17	Global	SV-107 CYCLE 17				
B12:12/0	SV108_C17	Global	SV-108 CYCLE 17				
B12:12/1	SV109_C17	Global	SV-109 CYCLE 17				
B12:12/2	SV110_C17	Global	SV-110 CYCLE 17				
B12:12/3	SV111_C17	Global	SV-111 CYCLE 17				
B12:12/4	SV102_C18	Global	SV-102 CYCLE 18				
B12:12/5	SV103_C18	Global	SV-103 CYCLE 18				
B12:12/6	SV104_C18	Global	SV-104 CYCLE 18				
B12:12/7	SV105_C18	Global	SV-105 CYCLE 18				
B12:12/8	SV106_C18	Global	SV-106 CYCLE 18				
B12:12/9	SV107_C18	Global	SV-107 CYCLE 18				
B12:12/10	SV108_C18	Global	SV-108 CYCLE 18				
B12:12/11	SV109_C18	Global	SV-109 CYCLE 18				
B12:12/12	SV110_C18	Global	SV-110 CYCLE 18				
B12:12/13	SV111_C18	Global	SV-111 CYCLE 18				
B12:12/14	SV102_C19	Global	SV-102 CYCLE 19				
B12:12/15	SV103_C19	Global	SV-103 CYCLE 19				
B12:13/0	SV104_C19	Global	SV-104 CYCLE 19				
B12:13/1	SV105_C19	Global	SV-105 CYCLE 19				
B12:13/2	SV106_C19	Global	SV-106 CYCLE 19				
B12:13/3	SV107_C19	Global	SV-107 CYCLE 19				
B12:13/4	SV108_C19	Global	SV-108 CYCLE 19				
B12:13/5	SV109_C19	Global	SV-109 CYCLE 19				
B12:13/6	SV110_C19	Global	SV-110 CYCLE 19				
B12:13/7	SV111_C19	Global	SV-111 CYCLE 19				
B12:13/8	SV102_C20	Global	SV-102 CYCLE 20				
B12:13/9	SV103_C20	Global	SV-103 CYCLE 20				
B12:13/10	SV104_C20	Global	SV-104 CYCLE 20				
B12:13/11	SV105_C20	Global	SV-105 CYCLE 20				
B12:13/12	SV106_C20	Global	SV-106 CYCLE 20				
B12:13/13	SV107_C20	Global	SV-107 CYCLE 20				
B12:13/14	SV108_C20	Global	SV-108 CYCLE 20				
B12:13/15	SV109_C20	Global	SV-109 CYCLE 20				
B12:14/0	SV110_C20	Global	SV-110 CYCLE 20				
B12:14/1	SV111_C20	Global	SV-111 CYCLE 20				
B12:14/2	SV102_C3	Global	SV-102 CYCLE 3				

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Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
B12:14/3	SV103_C3	Global	SV-103 CYCLE 3				
B12:14/4	SV104_C3	Global	SV-104 CYCLE 3				
B12:14/5	SV105_C3	Global	SV-105 CYCLE 3				
B12:14/6	SV106_C3	Global	SV-106 CYCLE 3				
B12:14/7	SV107_C3	Global	SV-107 CYCLE 3				
B12:14/8	SV108_C3	Global	SV-108 CYCLE 3				
B12:14/9	SV109_C3	Global	SV-109 CYCLE 3				
B12:14/10	SV110_C3	Global	SV-110 CYCLE 3				
B12:14/11	SV111_C3	Global	SV-111 CYCLE 3				
B13:0/0	HMI_RESET	Global	ALARM RESET ON HMI				
B13:0/1	C1_ENTER	Global	CYCLE 1 "ENTER" PUSHBUTTON ON HMI				
B13:0/2	C1_CLEAR	Global	CYCLE 1 "CLEAR" PUSHBUTTON ON HMI				
B13:0/3	C1_SELECT_SV102	Global	CYCLE 1 SELECT SV- 102				
B13:0/4	C1_SELECT_SV103	Global	CYCLE 1 SELECT SV- 103				
B13:0/5	C1_SELECT_SV104	Global	CYCLE 1 SELECT SV- 104				
B13:0/6	C1_SELECT_SV105	Global	CYCLE 1 SELECT SV- 105				
B13:0/7	C1_SELECT_SV106	Global	CYCLE 1 SELECT SV- 106				
B13:0/8	C1_SELECT_SV107	Global	CYCLE 1 SELECT SV- 107				
B13:0/9	C1_SELECT_SV108	Global	CYCLE 1 SELECT SV- 108				
B13:0/10	C1_SELECT_SV109	Global	CYCLE 1 SELECT SV- 109				
B13:0/11	C1_SELECT_SV110	Global	CYCLE 1 SELECT SV- 110				
B13:0/12	C1_SELECT_SV111	Global	CYCLE 1 SELECT SV- 111				
B13:0/13	C2_ENTER	Global	CYCLE 2 "ENTER" PUSHBUTTON				
B13:0/14	C2_ENABLED	Global	CYCLE 2 ENABLED				
B13:0/15	C2_CLEAR	Global	CYCLE 2 "CLEAR" PUSHBUTTON				
B13:1/0	C1_ENALBED	Global	CYCLE 1 ENABLE				
B13:1/1	C2_SELECT_SV102	Global	CYCLE 2 SELECT SV- 102				
B13:1/2	C2_SELECT_SV103	Global	CYCLE 2 SELECT SV- 103				
B13:1/3	C2_SELECT_SV104	Global	CYCLE 2 SELECT SV- 104				
B13:1/4	C2_SELECT_SV105	Global	CYCLE 2 SELECT SV- 105				
B13:1/5	C2_SELECT_SV106	Global	CYCLE 2 SELECT SV- 106				
B13:1/6	C2_SELECT_SV107	Global	CYCLE 2 SELECT SV- 107				
B13:1/7	C2_SELECT_SV108	Global	CYCLE 2 SELECT SV- 108				
B13:1/8	C2_SELECT_SV109	Global	CYCLE 2 SELECT SV- 109				
B13:1/9	C2_SELECT_SV110	Global	CYCLE 2 SELECT SV- 110				
B13:1/10	C2_SELECT_SV111	Global	CYCLE 2 SELECT SV- 111				
B13:1/11	C3_ENTER	Global	CYCLE 3 "ENTER" PUSHBUTTON				
B13:1/12	C3_CLEAR	Global	CYCLE 3 "CLEAR" PUSHBUTTON				
B13:1/13	C3_ENABLED	Global	CYCLE 3 ENABLED				
B13:1/14	C4_ENTER	Global	CYCLE 4 "ENTER" PUSHBUTTON				
B13:1/15	C4_CLEAR	Global	CYCLE 4 "CLEAR" PUSHBUTTON				
B13:2/0	C4_ENABLED	Global	CYCLE 4 ENABLED				
B13:2/1	C3_SELECT_SV102	Global	CYCLE 3 SELECT SV- 102				
B13:2/2	C3_SELECT_SV103	Global	CYCLE 3 SELECT SV- 103				
B13:2/3	C3_SELECT_SV104	Global	CYCLE 3 SELECT SV- 104				
B13:2/4	C3_SELECT_SV105	Global	CYCLE 3 SELECT SV- 105				
B13:2/5	C3_SELECT_SV106	Global	CYCLE 3 SELECT SV- 106				
B13:2/6	C3_SELECT_SV107	Global	CYCLE 3 SELECT SV- 107				
B13:2/7	C3_SELECT_SV108	Global	CYCLE 3 SELECT SV- 108				
B13:2/8	C3_SELECT_SV109	Global	CYCLE 3 SELECT SV- 109				
B13:2/9	C3_SELECT_SV110	Global	CYCLE 3 SELECT SV- 110				
B13:2/10	C3_SELECT_SV111	Global	CYCLE 3 SELECT SV- 111				
B13:2/11	C4_SELECT_SV102	Global	CYCLE 4 SELECT SV- 102				
B13:2/12	C4_SELECT_SV103	Global	CYCLE 4 SELECT SV- 103				
B13:2/13	C4_SELECT_SV104	Global	CYCLE 4 SELECT SV- 104				
B13:2/14	C4_SELECT_SV105	Global	CYCLE 4 SELECT SV- 105				
B13:2/15	C4_SELECT_SV106	Global	CYCLE 4 SELECT SV- 106				
B13:3/0	C4_SELECT_SV107	Global	CYCLE 4 SELECT SV- 107				
B13:3/1	C4_SELECT_SV108	Global	CYCLE 4 SELECT SV- 108				
B13:3/2	C4_SELECT_SV109	Global	CYCLE 4 SELECT SV- 109				
B13:3/3	C4_SELECT_SV110	Global	CYCLE 4 SELECT SV- 110				
B13:3/4	C4_SELECT_SV111	Global	CYCLE 4 SELECT SV- 111				
B13:3/5	C5_ENTER	Global	CYCLE 5 "ENTER" PUSHBUTTON				
B13:3/6	C5_CLEAR	Global	CYCLE 5 "CLEAR" PUSHBUTTON				
B13:3/7	C5_ENABLED	Global	CYCLE 5 ENABLED				
B13:3/8	C5_SELECT_SV102	Global	CYCLE 5 SELECT SV- 102				
B13:3/9	C5_SELECT_SV103	Global	CYCLE 5 SELECT SV- 103				
B13:3/10	C5_SELECT_SV104	Global	CYCLE 5 SELECT SV- 104				
B13:3/11	C5_SELECT_SV105	Global	CYCLE 5 SELECT SV- 105				
B13:3/12	C5_SELECT_SV106	Global	CYCLE 5 SELECT SV- 106				
B13:3/13	C5_SELECT_SV107	Global	CYCLE 5 SELECT SV- 107				
B13:3/14	C5_SELECT_SV108	Global	CYCLE 5 SELECT SV- 108				
B13:3/15	C5_SELECT_SV109	Global	CYCLE 5 SELECT SV- 109				
B13:4/0	C5_SELECT_SV110	Global	CYCLE 5 SELECT SV- 110				
B13:4/1	C5_SELECT_SV111	Global	CYCLE 5 SELECT SV- 111				
B13:4/2	C6_ENTER	Global	CYCLE 6 "ENTER" PUSHBUTTON				
B13:4/3	C6_CLEAR	Global	CYCLE 6 "CLEAR" PUSHBUTTON				
B13:4/4	C6_ENABLED	Global	CYCLE 6 ENABLED				
B13:4/5	C6_SELECT_SV102	Global	CYCLE 6 SELECT SV- 102				
B13:4/6	C6_SELECT_SV103	Global	CYCLE 6 SELECT SV- 103				
B13:4/7	C6_SELECT_SV104	Global	CYCLE 6 SELECT SV- 104				
B13:4/8	C6_SELECT_SV105	Global	CYCLE 6 SELECT SV- 105				
B13:4/9	C6_SELECT_SV106	Global	CYCLE 6 SELECT SV- 106				
B13:4/10	C6_SELECT_SV107	Global	CYCLE 6 SELECT SV- 107				
B13:4/11	C6_SELECT_SV108	Global	CYCLE 6 SELECT SV- 108				
B13:4/12	C6_SELECT_SV109	Global	CYCLE 6 SELECT SV- 109				
B13:4/13	C6_SELECT_SV110	Global	CYCLE 6 SELECT SV- 110				
B13:4/14	C6_SELECT_SV111	Global	CYCLE 6 SELECT SV- 111				
B13:4/15	C7_ENTER	Global	CYCLE 7 "ENTER" PUSHBUTTON				
B13:5/0	C7_CLEAR	Global	CYCLE 7 "CLEAR" PUSHBUTTON				
B13:5/1	C7_ENABLED	Global	CYCLE 7 ENABLED				
B13:5/2	C7_SELECT_SV102	Global	CYCLE 7 SELECT SV- 102				
B13:5/3	C7_SELECT_SV103	Global	CYCLE 7 SELECT SV- 103				
B13:5/4	C7_SELECT_SV104	Global	CYCLE 7 SELECT SV- 104				
B13:5/5	C7_SELECT_SV105	Global	CYCLE 7 SELECT SV- 105				
B13:5/6	C7_SELECT_SV106	Global	CYCLE 7 SELECT SV- 106				
B13:5/7	C7_SELECT_SV107	Global	CYCLE 7 SELECT SV- 107				
B13:5/8	C7_SELECT_SV108	Global	CYCLE 7 SELECT SV- 108				
B13:5/9	C7_SELECT_SV109	Global	CYCLE 7 SELECT SV- 109				
B13:5/10	C7_SELECT_SV110	Global	CYCLE 7 SELECT SV- 110				
B13:5/11	C7_SELECT_SV111	Global	CYCLE 7 SELECT SV- 111				
B13:5/12	C8_ENTER	Global	CYCLE 8 "ENTER" PUSHBUTTON				
B13:5/13	C8_CLEAR	Global	CYCLE 8 "CLEAR" PUSHBUTTON				
B13:5/14	C8_ENABLED	Global	CYCLE 8 ENABLED				
B13:5/15	C8_SELECT_SV102	Global	CYCLE 8 SELECT SV- 102				
B13:6/0	C8_SELECT_SV103	Global	CYCLE 8 SELECT SV- 103				
B13:6/1	C8_SELECT_SV104	Global	CYCLE 8 SELECT SV- 104				
B13:6/2	C8_SELECT_SV105	Global	CYCLE 8 SELECT SV- 105				
B13:6/3	C8_SELECT_SV106	Global	CYCLE 8 SELECT SV- 106				

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Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
B13:6/4	C8_SELECT_SV107	Global	CYCLE 8 SELECT SV- 107				
B13:6/5	C8_SELECT_SV108	Global	CYCLE 8 SELECT SV- 108				
B13:6/6	C8_SELECT_SV109	Global	CYCLE 8 SELECT SV- 109				
B13:6/7	C8_SELECT_SV110	Global	CYCLE 8 SELECT SV- 110				
B13:6/8	C8_SELECT_SV111	Global	CYCLE 8 SELECT SV- 111				
B13:6/9	C9_ENTER	Global	CYCLE 9 "ENTER" PUSHBUTTON				
B13:6/10	C9_CLEAR	Global	CYCLE 9 "CLEAR" PUSHBUTTON				
B13:6/11	C9_ENALBED	Global	CYCLE 9 ENABLED				
B13:6/12	C9_SELECT_SV102	Global	CYCLE 9 SELECT SV- 102				
B13:6/13	C9_SELECT_SV103	Global	CYCLE 9 SELECT SV- 103				
B13:6/14	C9_SELECT_SV104	Global	CYCLE 9 SELECT SV- 104				
B13:6/15	C9_SELECT_SV105	Global	CYCLE 9 SELECT SV- 105				
B13:7/0	C9_SELECT_SV106	Global	CYCLE 9 SELECT SV- 106				
B13:7/1	C9_SELECT_SV107	Global	CYCLE 9 SELECT SV- 107				
B13:7/2	C9_SELECT_SV108	Global	CYCLE 9 SELECT SV- 108				
B13:7/3	C9_SELECT_SV109	Global	CYCLE 9 SELECT SV- 109				
B13:7/4	C9_SELECT_SV110	Global	CYCLE 9 SELECT SV- 110				
B13:7/5	C9_SELECT_SV111	Global	CYCLE 9 SELECT SV- 111				
B13:7/6	C10_ENTER	Global	CYCLE 10 "ENTER" PUSHBUTTON				
B13:7/7	C10_CLEAR	Global	CYCLE 10 "CLEAR" PUSHBUTTON				
B13:7/8	C10_ENABLED	Global	CYCLE 10 ENABLED				
B13:7/9	C10_SELECT_SV102	Global	CYCLE 10 SELECT SV- 102				
B13:7/10	C10_SELECT_SV103	Global	CYCLE 10 SELECT SV- 103				
B13:7/11	C10_SELECT_SV104	Global	CYCLE 10 SELECT SV- 104				
B13:7/12	C10_SELECT_SV105	Global	CYCLE 10 SELECT SV- 105				
B13:7/13	C10_SELECT_SV106	Global	CYCLE 10 SELECT SV- 106				
B13:7/14	C10_SELECT_SV107	Global	CYCLE 10 SELECT SV- 107				
B13:7/15	C10_SELECT_SV108	Global	CYCLE 10 SELECT SV- 108				
B13:8/0	C10_SELECT_SV109	Global	CYCLE 10 SELECT SV- 109				
B13:8/1	C10_SELECT_SV110	Global	CYCLE 10 SELECT SV- 110				
B13:8/2	C10_SELECT_SV111	Global	CYCLE 10 SELECT SV- 111				
B13:8/3	C11_ENTER	Global	CYCLE 11 "ENTER" PUSHBUTTON				
B13:8/4	C11_CLEAR	Global	CYCLE 11 "CLEAR" PUSHBUTTON				
B13:8/5	C11_ENABLED	Global	CYCLE 11 ENABLE				
B13:8/6	C11_SELECT_SV102	Global	CYCLE 11 SELECT SV- 102				
B13:8/7	C11_SELECT_SV103	Global	CYCLE 11 SELECT SV- 103				
B13:8/8	C11_SELECT_SV104	Global	CYCLE 11 SELECT SV- 104				
B13:8/9	C11_SELECT_SV105	Global	CYCLE 11 SELECT SV- 105				
B13:8/10	C11_SELECT_SV106	Global	CYCLE 11 SELECT SV- 106				
B13:8/11	C11_SELECT_SV107	Global	CYCLE 11 SELECT SV- 107				
B13:8/12	C11_SELECT_SV108	Global	CYCLE 11 SELECT SV- 108				
B13:8/13	C11_SELECT_SV109	Global	CYCLE 11 SELECT SV- 109				
B13:8/14	C11_SELECT_SV110	Global	CYCLE 11 SELECT SV- 110				
B13:8/15	C11_SELECT_SV111	Global	CYCLE 11 SELECT SV- 111				
B13:9/0	C12_ENTER	Global	CYCLE 12 "ENTER" PUSHBUTTON				
B13:9/1	C12_CLEAR	Global	CYCLE 12 "CLEAR" PUSHBUTTON				
B13:9/2	C12_ENABLED	Global	CYCLE 12 ENABLE				
B13:9/3	C12_SELECT_SV102	Global	CYCLE 12 SELECT SV- 102				
B13:9/4	C12_SELECT_SV103	Global	CYCLE 12 SELECT SV- 103				
B13:9/5	C12_SELECT_SV104	Global	CYCLE 12 SELECT SV- 104				
B13:9/6	C12_SELECT_SV105	Global	CYCLE 12 SELECT SV- 105				
B13:9/7	C12_SELECT_SV106	Global	CYCLE 12 SELECT SV- 106				
B13:9/8	C12_SELECT_SV107	Global	CYCLE 12 SELECT SV- 107				
B13:9/9	C12_SELECT_SV108	Global	CYCLE 12 SELECT SV- 108				
B13:9/10	C12_SELECT_SV109	Global	CYCLE 12 SELECT SV- 109				
B13:9/11	C12_SELECT_SV110	Global	CYCLE 12 SELECT SV- 110				
B13:9/12	C12_SELECT_SV111	Global	CYCLE 12 SELECT SV- 111				
B13:9/13	C13_ENTER	Global	CYCLE 13 "ENTER" PUSHBUTTON				
B13:9/14	C13_CLEAR	Global	CYCLE 13 "CLEAR" PUSHBUTTON				
B13:9/15	C13_ENABLED	Global	CYCLE 13 ENABLE				
B13:10/0	C13_SELECT_SV102	Global	CYCLE 13 SELECT SV- 102				
B13:10/1	C13_SELECT_SV103	Global	CYCLE 13 SELECT SV- 103				
B13:10/2	C13_SELECT_SV104	Global	CYCLE 13 SELECT SV- 104				
B13:10/3	C13_SELECT_SV105	Global	CYCLE 13 SELECT SV- 105				
B13:10/4	C13_SELECT_SV106	Global	CYCLE 13 SELECT SV- 106				
B13:10/5	C13_SELECT_SV107	Global	CYCLE 13 SELECT SV- 107				
B13:10/6	C13_SELECT_SV108	Global	CYCLE 13 SELECT SV- 108				
B13:10/7	C13_SELECT_SV109	Global	CYCLE 13 SELECT SV- 109				
B13:10/8	C13_SELECT_SV110	Global	CYCLE 13 SELECT SV- 110				
B13:10/9	C13_SELECT_SV111	Global	CYCLE 13 SELECT SV- 111				
B13:10/10	C14_ENTER	Global	CYCLE 14 "ENTER" PUSHBUTTON				
B13:10/11	C14_CLEAR	Global	CYCLE 14 "CLEAR" PUSHBUTTON				
B13:10/12	C14_ENABLED	Global	CYCLE 14 ENABLE				
B13:10/13	C14_SELECT_SV102	Global	CYCLE 14 SELECT SV- 102				
B13:10/14	C14_SELECT_SV103	Global	CYCLE 14 SELECT SV- 103				
B13:10/15	C14_SELECT_SV104	Global	CYCLE 14 SELECT SV- 104				
B13:11/0	C14_SELECT_SV105	Global	CYCLE 14 SELECT SV- 105				
B13:11/1	C14_SELECT_SV106	Global	CYCLE 14 SELECT SV- 106				
B13:11/2	C14_SELECT_SV107	Global	CYCLE 14 SELECT SV- 107				
B13:11/3	C14_SELECT_SV108	Global	CYCLE 14 SELECT SV- 108				
B13:11/4	C14_SELECT_SV109	Global	CYCLE 14 SELECT SV- 109				
B13:11/5	C14_SELECT_SV110	Global	CYCLE 14 SELECT SV- 110				
B13:11/6	C14_SELECT_SV111	Global	CYCLE 14 SELECT SV- 111				
B13:11/7	C15_ENTER	Global	CYCLE 15 "ENTER" PUSHBUTTON				
B13:11/8	C15_CLEAR	Global	CYCLE 15 "CLEAR" PUSHBUTTON				
B13:11/9	C15_ENABLED	Global	CYCLE 15 ENABLE				
B13:11/10	C15_SELECT_SV102	Global	CYCLE 15 SELECT SV- 102				
B13:11/11	C15_SELECT_SV103	Global	CYCLE 15 SELECT SV- 103				
B13:11/12	C15_SELECT_SV104	Global	CYCLE 15 SELECT SV- 104				
B13:11/13	C15_SELECT_SV105	Global	CYCLE 15 SELECT SV- 105				
B13:11/14	C15_SELECT_SV106	Global	CYCLE 15 SELECT SV- 106				
B13:11/15	C15_SELECT_SV107	Global	CYCLE 15 SELECT SV- 107				
B13:12/0	C15_SELECT_SV108	Global	CYCLE 15 SELECT SV- 102				
B13:12/1	C15_SELECT_SV109	Global	CYCLE 15 SELECT SV- 109				
B13:12/2	C15_SELECT_SV110	Global	CYCLE 15 SELECT SV- 110				
B13:12/3	C15_SELECT_SV111	Global	CYCLE 15 SELECT SV- 111				
B13:12/4	C16_ENTER	Global	CYCLE 16 "ENTER" PUSHBUTTON				
B13:12/5	C16_CLEAR	Global	CYCLE 16 "CLEAR" PUSHBUTTON				
B13:12/6	C16_ENABLED	Global	CYCLE 16 ENABLE				
B13:12/7	C16_SELECT_SV102	Global	CYCLE 16 SELECT SV- 102				
B13:12/8	C16_SELECT_SV103	Global	CYCLE 16 SELECT SV- 103				
B13:12/9	C16_SELECT_SV104	Global	CYCLE 16 SELECT SV- 104				
B13:12/10	C16_SELECT_SV105	Global	CYCLE 16 SELECT SV- 105				
B13:12/11	C16_SELECT_SV106	Global	CYCLE 16 SELECT SV- 106				
B13:12/12	C16_SELECT_SV107	Global	CYCLE 16 SELECT SV- 107				
B13:12/13	C16_SELECT_SV108	Global	CYCLE 16 SELECT SV- 108				
B13:12/14	C16_SELECT_SV109	Global	CYCLE 16 SELECT SV- 109				
B13:12/15	C16_SELECT_SV110	Global	CYCLE 16 SELECT SV- 110				
B13:13/0	C16_SELECT_SV111	Global	CYCLE 16 SELECT SV- 111				

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Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
B13:13/1	C17_ENTER	Global	CYCLE 17 "ENTER" PUSHBUTTON				
B13:13/2	C17_CLEAR	Global	CYCLE 17 "CLEAR" PUSHBUTTON				
B13:13/3	C17_ENABLED	Global	CYCLE 17 ENABLED				
B13:13/4	C17_SELECT_SV102	Global	CYCLE 17 SELECT SV- 102				
B13:13/5	C17_SELECT_SV103	Global	CYCLE 17 SELECT SV- 103				
B13:13/6	C17_SELECT_SV104	Global	CYCLE 17 SELECT SV- 104				
B13:13/7	C17_SELECT_SV105	Global	CYCLE 17 SELECT SV- 105				
B13:13/8	C17_SELECT_SV106	Global	CYCLE 17 SELECT SV- 106				
B13:13/9	C17_SELECT_SV107	Global	CYCLE 17 SELECT SV- 107				
B13:13/10	C17_SELECT_SV108	Global	CYCLE 17 SELECT SV- 108				
B13:13/11	C17_SELECT_SV109	Global	CYCLE 17 SELECT SV- 109				
B13:13/12	C17_SELECT_SV110	Global	CYCLE 17 SELECT SV- 110				
B13:13/13	C17_SELECT_SV111	Global	CYCLE 17 SELECT SV- 111				
B13:13/14	C18_ENTER	Global	CYCLE 18 "ENTER" PUSHBUTTON				
B13:13/15	C18_CLEAR	Global	CYCLE 18 "CLEAR" PUSHBUTTON				
B13:14/0	C18_ENABLED	Global	CYCLE 18 ENABLED				
B13:14/1	C18_SELECT_SV102	Global	CYCLE 18 SELECT SV- 102				
B13:14/2	C18_SELECT_SV103	Global	CYCLE 18 SELECT SV- 103				
B13:14/3	C18_SELECT_SV104	Global	CYCLE 18 SELECT SV- 104				
B13:14/4	C18_SELECT_SV105	Global	CYCLE 18 SELECT SV- 105				
B13:14/5	C18_SELECT_SV106	Global	CYCLE 18 SELECT SV- 106				
B13:14/6	C18_SELECT_SV107	Global	CYCLE 18 SELECT SV- 107				
B13:14/7	C18_SELECT_SV108	Global	CYCLE 18 SELECT SV- 108				
B13:14/8	C18_SELECT_SV109	Global	CYCLE 18 SELECT SV- 109				
B13:14/9	C18_SELECT_SV110	Global	CYCLE 18 SELECT SV- 110				
B13:14/10	C18_SELECT_SV111	Global	CYCLE 18 SELECT SV- 111				
B13:14/11	C19_ENTER	Global	CYCLE 19 "ENTER" PUSHBUTTON				
B13:14/12	C19_CLEAR	Global	CYCLE 19 "CLEAR" PUSHBUTTON				
B13:14/13	C19_ENABLED	Global	CYCLE 19 ENABLED				
B13:14/14	C19_SELECT_SV102	Global	CYCLE 19 SELECT SV- 102				
B13:14/15	C19_SELECT_SV103	Global	CYCLE 19 SELECT SV- 103				
B13:15/0	C19_SELECT_SV104	Global	CYCLE 19 SELECT SV- 104				
B13:15/1	C19_SELECT_SV105	Global	CYCLE 19 SELECT SV- 105				
B13:15/2	C19_SELECT_SV106	Global	CYCLE 19 SELECT SV- 106				
B13:15/3	C19_SELECT_SV107	Global	CYCLE 19 SELECT SV- 107				
B13:15/4	C19_SELECT_SV108	Global	CYCLE 19 SELECT SV- 108				
B13:15/5	C19_SELECT_SV109	Global	CYCLE 19 SELECT SV- 109				
B13:15/6	C19_SELECT_SV110	Global	CYCLE 19 SELECT SV- 110				
B13:15/7	C19_SELECT_SV111	Global	CYCLE 19 SELECT SV- 111				
B13:15/8	C20_ENTER	Global	CYCLE 20 "ENTER" PUSHBUTTON				
B13:15/9	C20_CLEAR	Global	CYCLE 20 "CLEAR" PUSHBUTTON				
B13:15/10	C20_ENABLED	Global	CYCLE 20 ENABLED				
B13:15/11	C20_SELECT_SV102	Global	CYCLE 20 SELECT SV- 102				
B13:15/12	C20_SELECT_SV103	Global	CYCLE 20 SELECT SV- 103				
B13:15/13	C20_SELECT_SV104	Global	CYCLE 20 SELECT SV- 104				
B13:15/14	C20_SELECT_SV105	Global	CYCLE 20 SELECT SV- 105				
B13:15/15	C20_SELECT_SV106	Global	CYCLE 20 SELECT SV- 106				
B13:16/0	C20_SELECT_SV107	Global	CYCLE 20 SELECT SV- 107				
B13:16/1	C20_SELECT_SV108	Global	CYCLE 20 SELECT SV- 108				
B13:16/2	C20_SELECT_SV109	Global	CYCLE 20 SELECT SV- 109				
B13:16/3	C20_SELECT_SV110	Global	CYCLE 20 SELECT SV- 110				
B13:16/4	C20_SELECT_SV111	Global	CYCLE 20 SELECT SV- 111				
B13:16/5	RH_ALARM	Global	REL HUMIDITY ALARM				
B13:16/6	TT103_HT_ALARM	Global	INTERIOR HIGH TEMP ALARM				
B13:16/7	PT102_HP_ALARM	Global	PT-102 HIGH PRESSURE ALARM				
B13:16/8	PT102_LP_ALARM	Global	PT-102 LOW PRESS ALARM				
B13:16/9	TT101_HT_ALARM	Global	TT-101 HIGH TEMP ALARM				
B13:16/10	PT101_HP_ALARM	Global	PT-101HIGH PRESS ALARM				
B13:16/11	PT101_LP_ALARM	Global	PT-101 LOW PRESS ALARM				
B13:16/12	FT102_LF_ALARM	Global	FT-102 LOW FLOW ALARM				
B13:16/13	PT103_HP_ALARM	Global	PT-103 HIGH PRESS ALARM				
B13:16/14	PT103_LP_ALARM	Global	PT-103 LOW PRESS ALARM				
B13:16/15	PT104_HP_ALARM	Global	PT-104 HIGH PRESS ALARM				
B13:17/0	HMI_ASCOMP_AUTO	Global	AS COMPRESSOR AUTO FROM HMI				
B13:17/1	HMI_ASCOMP_HAND	Global	AS COMPRESSOR HAND FROM HMI				
B13:17/2	HMI_SV101_AUTO	Global	SV-101 AUTO FROM HMI				
B13:17/3	HMI_SV101_HAND	Global	SV-101HAND FROM HMI				
B13:17/4	PT104_LP_ALARM	Global	PT-104 LOW PRESS ALARM				
B13:17/5	PT105_HP_ALARM	Global	PT-105 HIGH PRESS ALARM				
B13:17/6	PT105_LP_ALRM	Global	PT-105 LOW PRESS ALARM				
B13:17/7	PT106_HP_ALARM	Global	PT-106 HIGH PRESS ALARM				
B13:17/8	PT106_LP_ALARM	Global	PT-106 LOW PRESS ALARM				
B13:17/9	PT107_HP_ALARM	Global	PT-107 HIGH PRESS ALARM				
B13:17/10	PT107_LP_ALARM	Global	PT-107 LOW PRESS ALARM				
B13:17/11	PT108_HP_ALARM	Global	PT-108 HIGH PRESS ALARM				
B13:17/12	PT108_LP_ALARM	Global	PT-108 LOW PRESS ALARM				
B13:17/13	PT109_HP_ALARM	Global	PT-109 HIGH PRESS ALARM				
B13:17/14	PT109_LP_ALARM	Global	PT-109 LOW PRESS ALARM				
B13:17/15	PT110_HP_ALARM	Global	PT-110 HIGH PRESS ALARM				
B13:18/0	PT110_LP_ALARM	Global	PT-110 LOW PRESS ALARM				
B13:18/1	PT111_HP_ALARM	Global	PT-111 HIGH PRESS ALARM				
B13:18/2	PT111_LP_ALARM	Global	PT-111 LOW PRESS ALARM				
B13:18/3	PT112_HP_ALARM	Global	PT-112 HIGH PRESS ALARM				
B13:18/4	PT112_LP_ALARM	Global	PT-112 LOW PRESS ALARM				
B13:18/5	FT102_HF_ALARM	Global	FT-102 HIGH FLOW ALARM				
B13:18/6	SYS_COMMON_INT	Global	SYSTEM COMMON ALARM/INTERLOCK				
F11:0	TT101_SCALED	Global	TEMP TRANS TT-101 SCALED VALUE				
F11:1	FT101_SCALED	Global	FLOW TRANS FT-101 SCALED VALUE				
F11:2	TT103_SCALED	Global	TEMP TRANS TT-103 SCALED VALUE				
F11:3	PT101_SCALED	Global	PRESS TRANS PT-101 SCALED VALUE				
F11:4	TT102_SCALED	Global	TEMP TRANS TT-102 SCALED VALUE				
F11:5	PT102_SCALED	Global	PRESS TRANS PT-102 SCALED VALUE				
F11:6	FT102_SCALED	Global	FLOW TRANS FT-102 SCALED VALUE				
F11:7	RHT101_SCALED	Global	REL HUMIDITY TRANS RHT-101 SCALED VALUE				
F11:8	PT103_SCALED	Global	PRESS TRANS PT-103 SCALED VALUE				
F11:9	FT103_SCALED	Global	FLOW TRANS FT-103 SCALED VALUE				
F11:10	PT104_SCALED	Global	PRESS TRANS PT-104 SCALED VALUE				
F11:11	FT104_SCALED	Global	FLOW TRANS FT-104 SCALED VALUE				
F11:12	PT105_SCALED	Global	PRESS TRANS PT-105 SCALED VALUE				
F11:13	FT105_SCALED	Global	FLOW TRANS FT-105 SCALED VALUE				
F11:14	PT106_SCALED	Global	PRESS TRANS PT-106 SCALED VALUE				
F11:15	FT106_SCALED	Global	FLOW TRANS FT-106 SCALED VALUE				
F11:16	PT107_SCALED	Global	PRESS TRANS PT-107 SCALED VALUE				
F11:17	FT107_SCALED	Global	FLOW TRANS FT-107 SCALED VALUE				
F11:18	PT108_SCALED	Global	PRESS TRANS PT-108 SCALED VALUE				
F11:19	FT108_SCALED	Global	FLOW TRANS FT-108 SCALED VALUE				
F11:20	PT109_SCALED	Global	PRESS TRANS PT-109 SCALED VALUE				
F11:21	FT109_SCALED	Global	FLOW TRANS FT-109 SCALED VALUE				
F11:22	PT110_SCALED	Global	PRESS TRANS PT-110 SCALED VALUE				

Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
F11:23	FT110_SCALED	Global	FLOW TRANS FT-110 SCALED VALUE				
F11:24	PT111_SCALED	Global	PRESS TRANS PT-111 SCALED VALUE				
F11:25	FT111_SCALED	Global	FLOW TRANS FT-111 SCALED VALUE				
F11:26	PT112_SCALED	Global	PRESS TRANS PT-112 SCALED VALUE				
F11:27	FT112_SCALED	Global	FLOW TRANS FT-112 SCALED VALUE				
F11:28	AIR_COMP_RT	Global	AIR SPARGE COMPRESSOR RUNTIME				
I:0/0	ESTOP_R	Global	ESTOP INPUT RAW				
I:0/1	PHAMON_R	Global	PHASE MONITOR INPUT RAW				
I:0/2	COND_SEP_HH_R	Global	CONDENSATE SEPARATOR HI HI INPUT RAW				
I:0/3	AS_COMP_STATUR_R	Global	AIR COMPRESSOR RUN STATUS INPUT RAW				
I:0/4	AS_COMP_LOADED_R	Global	AIR SPARGE COMPRESSOR LOADED SIGNAL INPUT RAW				
I:0/5	AS_WARN_SIGNAL_R	Global	AIR SPARGE WARNING SIGNAL INPUT RAW				
I:0/6	AS_ALARM_R	Global	AIR SPARGE ALARM INDICATION INPUT RAW				
I:1.0	TT101_R	Global	TEMP TRANS TT-101 ANALOG INPUT RAW				
I:1.1	FT101_R	Global	FLOW TRANS FT-101 ANALOG INPUT RAW				
I:1.2	TT103_R	Global	TEMP TRANS TT-103 ANALOG INPUT RAW				
I:1.3	PT101_R	Global	PRESS TRANS PT-101 ANALOG INPUT RAW				
I:1.4	TT102_R	Global	TEMP TRANS TT-102 ANALOG INPUT RAW				
I:1.5	PT102_R	Global	PRESS TRANS PT-102 ANALOG INPUT RAW				
I:1.6	FT102_R	Global	FLOW TRANS FT-102 ANALOG INPUT RAW				
I:1.7	RHT101_R	Global	REL HUMIDITY TRANS RHT-101 ANALOG INPUT RAW				
I:2.0	PT103_R	Global	PRESS TRANS PT-103 ANALOG INPUT RAW				
I:2.1	FT103_R	Global	FLOW TRANS FT-103 ANALOG INPUT RAW				
I:2.2	PT104_R	Global	PRESS TRANS PT-104 ANALOG INPUT RAW				
I:2.3	FT104_R	Global	FLOW TRANS FT-104 ANALOG INPUT RAW				
I:2.4	PT105_R	Global	PRESS TRANS PT-105 ANALOG INPUT RAW				
I:2.5	FT105_R	Global	FLOW TRANS FT-105 ANALOG INPUT RAW				
I:2.6	PT106_R	Global	PRESS TRANS PT-106 ANALOG INPUT RAW				
I:2.7	FT106_R	Global	FLOW TRANS FT-106 ANALOG INPUT RAW				
I:3.0	PT107_R	Global	PRESS TRANS PT-107 ANALOG INPUT RAW				
I:3.1	FT107_R	Global	FLOW TRANS FT-107 ANALOG INPUT RAW				
I:3.2	PT108_R	Global	PRESS TRANS PT-108 ANALOG INPUT RAW				
I:3.3	FT108_R	Global	FLOW TRANS FT-108 ANALOG INPUT RAW				
I:3.4	PT109_R	Global	PRESS TRANS PT-109 ANALOG INPUT RAW				
I:3.5	FT109_R	Global	FLOW TRANS FT-109 ANALOG INPUT RAW				
I:3.6	PT110_R	Global	PRESS TRANS PT-110 ANALOG INPUT RAW				
I:3.7	FT110_R	Global	FLOW TRANS FT-110 ANALOG INPUT RAW				
I:4.0	PT111_R	Global	PRESS TRANS PT-111 ANALOG INPUT RAW				
I:4.1	FT111_R	Global	FLOW TRANS FT-111 ANALOG INPUT RAW				
I:4.2	PT112_R	Global	PRESS TRANS PT-112 ANALOG INPUT RAW				
I:4.3	FT112_R	Global	FLOW TRANS FT-112 ANALOG INPUT RAW				
N9:0	HMI_C1_ON_HR_SP	Global	CYCLE 1 ON HOUR SETPOINT				
N9:1	HMI_C1_ON_MIN_SP	Global	CYCLE 1 ON MINUTE SETPOINT				
N9:2	HMI_C1_OFF_HR_SP	Global	CYCLE 1 OFF HOUR SETPOINT				
N9:3	HMI_C1_OFF_MIN_SP	Global	CYCLE 1 OFF MINUTE SETPOINT				
N9:4	HMI_C2_ON_HR_SP	Global	CYCLE 2 ON HOUR SETPOINT				
N9:5	HMI_C2_ON_MIN_SP	Global	CYCLE 2 ON MINUTE SETPOINT				
N9:6	HMI_C2_OFF_HR_SP	Global	CYCLE 2 OFF HOUR SETPOINT				
N9:7	HMI_C2_OFF_MIN_SP	Global	CYCLE 2 OFF MINUTE SETPOINT				
N9:8	HMI_C3_ON_HR_SP	Global	CYCLE 3 ON HOUR SETPOINT				
N9:9	HMI_C3_ON_MIN_SP	Global	CYCLE 3 ON MINUTE SETPOINT				
N9:10	HMI_C3_OFF_HR_SP	Global	CYCLE 3 OFF HOUR SETPOINT				
N9:11	HMI_C3_OFF_MIN_SP	Global	CYCLE 3 OFF MINUTE SETPOINT				
N9:12	HMI_C4_ON_HR_SP	Global	CYCLE 4 ON HOUR SETPOINT				
N9:13	HMI_C4_ON_MIN_SP	Global	CYCLE 4 ON MINUTE SETPOINT				
N9:14	HMI_C4_OFF_HR_SP	Global	CYCLE 4 OFF HOUR SETPOINT				
N9:15	HMI_C4_OFF_MIN_SP	Global	CYCLE 4 OFF MINUTE SETPOINT				
N9:16	HMI_C5_ON_HR_SP	Global	CYCLE 5 ON HOUR SETPOINT				
N9:17	HMI_C5_ON_MIN_SP	Global	CYCLE 5 ON MINUTE SETPOINT				
N9:18	HMI_C5_OFF_HR_SP	Global	CYCLE 5 OFF HOUR SETPOINT				
N9:19	HMI_C5_OFF_MIN_SP	Global	CYCLE 5 OFF MINUTE SETPOINT				
N9:20	HMI_C6_ON_HR_SP	Global	CYCLE 6 ON HOUR SETPOINT				
N9:21	HMI_C6_ON_MIN_SP	Global	CYCLE 6 ON MIN SETPOINT				
N9:22	HMI_C6_OFF_HR_SP	Global	CYCLE 6 OFF HOUR SETPOINT				
N9:23	HMI_C6_OFF_MIN_SP	Global	CYCLE 6 OFF MIN SETPOINT				
N9:24	HMI_C7_ON_HR_SP	Global	CYCLE 7 ON HOUR SETPOINT				
N9:25	HMI_C7_ON_MIN_SP	Global	CYCLE 7 ON MINUTE SETPOINT				
N9:26	HMI_C7_OFF_HR_SP	Global	CYCLE 7 OFF HOUR SETPOINT				
N9:27	HMI_C7_OFF_MIN_SP	Global	CYCLE 7 OFF MINUTE SETPOINT				
N9:28	HMI_C8_ON_HR_SP	Global	CYCLE 8 ON HOUR SETPOINT				
N9:29	HMI_C8_ON_MIN_SP	Global	CYCLE 8 ON MINUTE SETPOINT				
N9:30	HMI_C8_OFF_HR_SP	Global	CYCLE 8 OFF HOUR SETPOINT				
N9:31	HMI_C8_OFF_MIN_SP	Global	CYCLE 8 OFF MINUTE SETPOINT				
N9:32	HMI_C9_ON_HR_SP	Global	CYCLE 9 ON HOUR SETPONT				
N9:33	HMI_C9_ON_MIN_SP	Global	CYCLE 9 ON MINUTE SETPOINT				
N9:34	HMI_C9_OFF_HR_SP	Global	CYCLE 9 OFF HOUR SETPOINT				
N9:35	HMI_C9_OFF_MIN_SP	Global	CYCLE 9 OFF MINUTE SETPOINT				
N9:36	HMI_C10_ON_HR_SP	Global	CYCLE 10 ON HOUR SETPOINT				
N9:37	HMI_C10_ON_MIN_SP	Global	CYCLE 10 ON MINUTE SETPOINT				
N9:38	HMI_C10_OFF_HR_SP	Global	CYCLE 10 OFF HOUR SETPOINT				
N9:39	HMI_C10_OFF_MIN_SP	Global	CYCLE 10 OFF MINUTE SETPOINT				
N9:40	HMI_C11_ON_HR_SP	Global	CYCLE 11 ON HOUR SETPOINT				
N9:41	HMI_C11_ON_MIN_SP	Global	CYCLE 11 ON MINUTE SETPOINT				
N9:42	HMI_C11_OFF_HR_SP	Global	CYCLE 11 OFF HOUR SETPOINT				
N9:43	HMI_C11_OFF_MIN_SP	Global	CYCLE 11 OFF MINUTE SETPOINT				
N9:44	HMI_C12_ON_HR_SP	Global	CYCLE 12 ON HOUR SETPOINT				
N9:45	HMI_C12_ON_MIN_SP	Global	CYCLE 12 ON MINUTE SETPOINT				
N9:46	HMI_C12_OFF_HR_SP	Global	CYCLE 12 OFF HOUR SETPOINT				
N9:47	HMI_C12_OFF_MIN_SP	Global	CYCLE 12 OFF MINUTE SETPOINT				
N9:48	HMI_C13_ON_HR_SP	Global	CYCLE 13 ON HOUR SETPOINT				
N9:49	HMI_C13_ON_MIN_SP	Global	CYCLE 13 ON MINUTE SETPOINT				
N9:50	HMI_C13_OFF_HR_SP	Global	CYCLE 13 OFF HOUR SETPOINT				
N9:51	HMI_C13_OFF_MIN_SP	Global	CYCLE 13 OFF MINUTE SETPOINT				
N9:52	HMI_C14_ON_HR_SP	Global	CYCLE 14 ON HOUR SETPOINT				
N9:53	HMI_C14_ON_MIN_SP	Global	CYCLE 14 ON MINUTE SETPOINT				
N9:54	HMI_C14_OFF_HR_SP	Global	CYCLE 14 OFF HOUR SETPOINT				
N9:55	HMI_C14_OFF_MIN_SP	Global	CYCLE 14 OFF MINUTE SETPOINT				
N9:56	HMI_C15_ON_HR_SP	Global	CYCLE 15 ON HOUR SETPOINT				
N9:57	HMI_C15_ON_MIN_SP	Global	CYCLE 15 ON MINUTE SETPOINT				
N9:58	HMI_C15_OFF_HR_SP	Global	CYCLE 15 OFF HOUR SETPOINT				
N9:59	HMI_C15_OFF_MIN_SP	Global	CYCLE 15 OFF MINUTE SETPOINT				
N9:60	HMI_C16_ON_HR_SP	Global	CYCLE 16 ON HOUR SETPOINT				
N9:61	HMI_C16_ON_MIN_SP	Global	CYCLE 16 ON MINUTE SETPOINT				
N9:62	HMI_C16_OFF_HR_SP	Global	CYCLE 16 OFF HOUR SETPOINT				
N9:63	HMI_C16_OFF_MIN_SP	Global	CYCLE 16 OFF MINUTE SETPOINT				
N9:64	HMI_C17_ON_HR_SP	Global	CYCLE 17 ON HOUR SETPOINT				
N9:65	HMI_C17_ON_MIN_SP	Global	CYCLE 17 ON MINUTE SETPOINT				
N9:66	HMI_C17_OFF_HR_SP	Global	CYCLE 17 OFF HOUR SETPOINT				
N9:67	HMI_C17_OFF_MIN_SP	Global	CYCLE 17 OFF MINUTE SETPOINT				

Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
N9:68	HMI_C18_ON_HR_SP	Global	CYCLE 18 ON HOUR SETPOINT				
N9:69	HMI_C18_ON_MIN_SP	Global	CYCLE 18 ON MINUTE SETPOINT				
N9:70	HMI_C18_OFF_HR_SP	Global	CYCLE 18 OFF HOUR SETPOINT				
N9:71	HMI_C18_OFF_MIN_SP	Global	CYCLE 18 OFF MINUTE SETPOINT				
N9:72	HMI_C19_ON_HR_SP	Global	CYCLE 19 ON HOUR SETPOINT				
N9:73	HMI_C19_ON_MIN_SP	Global	CYCLE 19 ON MINUTE SETPOINT				
N9:74	HMI_C19_OFF_HR_SP	Global	CYCLE 19 OFF HOUR SETPOINT				
N9:75	HMI_C19_OFF_MIN_SP	Global	CYCLE 19 OFF MINUTE SETPOINT				
N9:76	HMI_C20_ON_HR_SP	Global	CYCLE 20 ON HOUR SETPOINT				
N9:77	HMI_C20_ON_MIN_SP	Global	CYCLE 20 ON MINUTE SETPOINT				
N9:78	HMI_C20_OFF_HR_SP	Global	CYCLE 20 OFF HOUR SETPOINT				
N9:79	HMI_C20_OFF_MIN_SP	Global	CYCLE 20 OFF MINUTE SETPOINT				
N9:80	RH_ALARM_SP	Global	REL HUMIDITY ALARM SETPOINT				
N9:81	TT103_HT_ALRM_SP	Global	TT-103 INTERIOR HIGH TEMP ALARM SETPOINT				
N9:82	PT102_HP_SP	Global	PT-102 HIGH PRESS ALARM SETPOINT				
N9:83	PT102_LP_SP	Global	PT-101 LOW PRESS ALARM SETPOINT				
N9:84	TT101_HT_SP	Global	TT-101 HIGH TEMP ALARM SETPOINT				
N9:85	PT101_HP_SP	Global	PT-101 HIGH DISCH PRESSURE SETPOINT				
N9:86	PT101_LP_SP	Global	COMPRESSOR LOW PRESS ALARM SETPOINT				
N9:87	FT102_LF_SP	Global	FT-102 LOW FLOW ALARM SETPOINT				
N9:88	PT103_HP_SP	Global	PT-103 HIGH PRESS ALARM SETPOINT				
N9:89	PT103_LP_SP	Global	PT-103 LOW PRESS ALARM SETPOINT				
N9:90	PT104_HP_SP	Global	PT-104 HIGH PRESS ALARM SETPOINT				
N9:91	PT104_LP_SP	Global	PT-104 LOW PRESS ALARM SETPOINT				
N9:92	PT105_HP_SP	Global	PT-105 HIGH PRESS ALARM SEPTOINT				
N9:93	PT105_LP_SP	Global	PT-105 LOW PRESS ALARM SETPOINT				
N9:94	PT106_HP_SP	Global	PT-106 HIGH PRESS ALARM SETPOINT				
N9:95	PT106_LP_SP	Global	PT-106 LOW PRESS ALARM SETPOINT				
N9:96	PT107_HP_SP	Global	PT-107 HIGH PRESS ALARM SETPOINT				
N9:97	PT107_LP_SP	Global	PT-107 LOW PRESS ALARM SETPOINT				
N9:98	PT108_HP_SP	Global	PT-108 HIGH PRESS ALARM SETPOINT				
N9:99	PT108_LP_SP	Global	PT-108 LOW PRESS ALARM SETPOINT				
N9:100	PT109_HP_SP	Global	PT-109 HIGH PRESS ALARM SETPOINT				
N9:101	PT109_LP_SP	Global	PT-109 LOW PRESS ALARM SETPOINT				
N9:102	PT110_HP_SP	Global	PT-110 HIGH PRESS ALARM SETPOINT				
N9:103	PT110_LP_SP	Global	PT-110 LOW PRESS ALARM SETPOINT				
N9:104	PT111_HP_SP	Global	PT-111 HIGH PRESS ALARM SETPOINT				
N9:105	PT111_LP_SP	Global	PT-111 LOW PRESS ALARM SETPOINT				
N9:106	PT112_HP_SP	Global	PT-112 HIGH PRESS ALARM SETPOINT				
N9:107	TP112_LP_SP	Global	PT-112 LOW PRESS ALARM SETPOINT				
N9:108	FT102_HF_SP	Global	FT-102 HIGH FLOW ALARM SETPOINT				
O:0/0	AS_COMP_CR_R	Global	AIR SPARGE COMPR CONTROL RELAY OUTPUT RAW				
O:0/1	SV101_R	Global	SOL VALVE SV-101 OUTPUT RAW				
O:0/2	SV102_R	Global	SOL VALVE SV-102 OUTPUT RAW				
O:0/3	SV103_R	Global	SOL VALVE SV-103 OUTPUT RAW				
O:0/4	SV104_R	Global	SOL VALVE SV-104 OUTPUT RAW				
O:0/5	SV105_R	Global	SOL VALVE SV-105 OUTPUT RAW				
O:0/6	SV106_R	Global	SOL VALVE SV-106 OUTPUT RAW				
O:0/7	SV107_R	Global	SOL VALVE SV-107 OUTPUT RAW				
O:0/8	SV108_R	Global	SOL VALVE SV-108 OUTPUT RAW				
O:0/9	SV109_R	Global	SOL VALVE SV-109 OUTPUT RAW				
O:0/10	SV110_R	Global	SOL VALVE SV-110 OUTPUT RAW				
O:0/11	SV111_R	Global	SOL VALVE SV-111 OUTPUT RAW				
RTC:0.HR							
S:0			Arithmetic Flags				
S:0/0			Processor Arithmetic Carry Flag				
S:0/1			Processor Arithmetic Underflow/ Overflow Flag				
S:0/2			Processor Arithmetic Zero Flag				
S:0/3			Processor Arithmetic Sign Flag				
S:1			Processor Mode Status/ Control				
S:1/0			Processor Mode Bit 0				
S:1/1			Processor Mode Bit 1				
S:1/2			Processor Mode Bit 2				
S:1/3			Processor Mode Bit 3				
S:1/4			Processor Mode Bit 4				
S:1/5			Forces Enabled				
S:1/6			Forces Present				
S:1/7			Comms Active				
S:1/8			Fault Override at Powerup				
S:1/9			Startup Protection Fault				
S:1/10			Load Memory Module on Memory Error				
S:1/11			Load Memory Module Always				
S:1/12			Load Memory Module and RUN				
S:1/13			Major Error Halted				
S:1/14			Access Denied				
S:1/15			First Pass				
S:2/0			STI Pending				
S:2/1			STI Enabled				
S:2/2			STI Executing				
S:2/3			Index Addressing File Range				
S:2/4			Saved with Debug Single Step				
S:2/5			DH-485 Incoming Command Pending				
S:2/6			DH-485 Message Reply Pending				
S:2/7			DH-485 Outgoing Message Command Pending				
S:2/15			Comms Servicing Selection				
S:3			Current Scan Time/ Watchdog Scan Time				
S:4			Time Base				
S:5/0			Overflow Trap				
S:5/2			Control Register Error				
S:5/3			Major Err Detected Executing UserFault Routine				
S:5/4			M0-M1 Referenced on Disabled Slot				
S:5/8			Memory Module Boot				
S:5/9			Memory Module Password Mismatch				
S:5/10			STI Overflow				
S:5/11			Battery Low				
S:6			Major Error Fault Code				
S:7			Suspend Code				
S:8			Suspend File				
S:9			Active Nodes				
S:10			Active Nodes				
S:11			I/O Slot Enables				
S:12			I/O Slot Enables				
S:13			Math Register				
S:14			Math Register				
S:15			Node Address/ Baud Rate				
S:16			Debug Single Step Rung				
S:17			Debug Single Step File				
S:18			Debug Single Step Breakpoint Rung				
S:19			Debug Single Step Breakpoint File				

Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
S:20			Debug Fault/ Powerdown Rung				
S:21			Debug Fault/ Powerdown File				
S:22			Maximum Observed Scan Time				
S:23			Average Scan Time				
S:24			Index Register				
S:25			I/O Interrupt Pending				
S:26			I/O Interrupt Pending				
S:27			I/O Interrupt Enabled				
S:28			I/O Interrupt Enabled				
S:29			User Fault Routine File Number				
S:30			STI Setpoint				
S:31			STI File Number				
S:32			I/O Interrupt Executing				
S:33			Extended Proc Status Control Word				
S:33/0			Incoming Command Pending				
S:33/1			Message Reply Pending				
S:33/2			Outgoing Message Command Pending				
S:33/3			Selection Status User/DF1				
S:33/4			Communicat Active				
S:33/5			Communicat Servicing Selection				
S:33/6			Message Servicing Selection Channel 0				
S:33/7			Message Servicing Selection Channel 1				
S:33/8			Interrupt Latency Control Flag				
S:33/9			Scan Toggle Flag				
S:33/10			Discrete Input Interrupt Reconfigur Flag				
S:33/11			Online Edit Status				
S:33/12			Online Edit Status				
S:33/13			Scan Time Timebase Selection				
S:33/14			DTR Control Bit				
S:33/15			DTR Force Bit				
S:34			Pass-thru Disabled				
S:34/0			Pass-Thru Disabled Flag				
S:34/1			DH+ Active Node Table Enable Flag				
S:34/2			Floating Point Math Flag Disable,Fl				
S:35			Last 1 ms Scan Time				
S:36			Extended Minor Error Bits				
S:36/8			DII Lost				
S:36/9			STI Lost				
S:36/10			Memory Module Data File Overwrite Protection				
S:37			Clock Calendar Year				
S:38			Clock Calendar Month				
S:39			Clock Calendar Day				
S:40			Clock Calendar Hours				
S:41			Clock Calendar Minutes				
S:42			Clock Calendar Seconds				
S:43			STI Interrupt Time				
S:44			I/O Event Interrupt Time				
S:45			DII Interrupt Time				
S:46			Discrete Input Interrupt- File Number				
S:47			Discrete Input Interrupt- Slot Number				
S:48			Discrete Input Interrupt- Bit Mask				
S:49			Discrete Input Interrupt- Compare Value				
S:50			Processor Catalog Number				
S:51			Discrete Input Interrupt- Return Number				
S:52			Discrete Input Interrupt- Accumulat				
S:53			Reserved/ Clock Calendar Day of the Week				
S:55			Last DII Scan Time				
S:56			Maximum Observed DII Scan Time				
S:57			Operating System Catalog Number				
S:58			Operating System Series				
S:59			Operating System FRN				
S:61			Processor Series				
S:62			Processor Revision				
S:63			User Program Type				
S:64			User Program Functional Index				
S:65			User RAM Size				
S:66			Flash EEPROM Size				
S:67			Channel 0 Active Nodes				
S:68			Channel 0 Active Nodes				
S:69			Channel 0 Active Nodes				
S:70			Channel 0 Active Nodes				
S:71			Channel 0 Active Nodes				
S:72			Channel 0 Active Nodes				
S:73			Channel 0 Active Nodes				
S:74			Channel 0 Active Nodes				
S:75			Channel 0 Active Nodes				
S:76			Channel 0 Active Nodes				
S:77			Channel 0 Active Nodes				
S:78			Channel 0 Active Nodes				
S:79			Channel 0 Active Nodes				
S:80			Channel 0 Active Nodes				
S:81			Channel 0 Active Nodes				
T18:23							

Instruction Comment Database

Address	Instruction	Description

Symbol Group Database

Group_Name	Description

LISTEN. THINK. SOLVE.®

PRODUCT PROFILE

MicroLogix™ 1400 / 1766

Small Programmable Logic Controller

Advantages

- Expand your application capabilities with up to 7 expansion I/O modules for a maximum of 256 discrete I/O
- Up to 6 embedded 100 kHz high-speed counters (on controllers with dc inputs)
- 2 Serial ports with DF1/ DH485/Modbus RTU/DNP3/ASCII protocol support
- Ethernet port provides you with peer-to-peer messaging, web server and email capabilities
- Built-in LCD with backlight allows you to view controller and I/O status, and provides a simple interface for messages, bit / integer monitoring and manipulation

Target Applications

- *General Industrial Machinery (Material Handling, Packaging, Assembly, etc.)*
- *HVAC/Building Automation*
- *SCADA (Oil & Gas, Water/Waste Water, and Electric Power)*
- *Food & Beverage*
- *Pharmaceutical*
- *Commercial Machinery (Vending, Industrial Washers & Dryers, etc.)*



Overview

The new Allen-Bradley® MicroLogix™ 1400 from Rockwell Automation complements the existing MicroLogix family of small programmable logic controllers. MicroLogix 1400 combines the features you demand from MicroLogix 1100, such as EtherNet/IP, online editing, and a built-in LCD, plus provides you with enhanced features, such as: higher I/O count, faster High Speed Counter/PTO and enhanced network capabilities

Take advantage of the built-in LCD with back lighting to set the Ethernet network configuration, display floating point values on a user configurable display, display OEM logos at startup and read or write any binary, integer and long file elements in the data table. Controllers without embedded analog come with 32 digital I/O count, while analog versions have 32 digital I/O and 6 analog I/O. All versions can be expanded using up to seven 1762 I/O modules - the same I/O modules that MicroLogix 1100 and 1200 utilize.

Three embedded communication ports provide you with superior communications capabilities. MicroLogix 1400 offers an isolated RS232C/RS485 combination port; a non-isolated RS232C port; and an RJ-45 port for 10/100 Mbps EtherNet/IP peer-to-peer messaging.

Similar to the rest of the MicroLogix family, MicroLogix 1400 is programmed with RSLogix 500 programming software (Version 8.1 and above) as well as new RSLogix Micro programming software.

SPECIFICATIONS

MicroLogix	1766-L32BWA	1766-L32AWA	1766-L32BXB	1766-L32BWAA	1766-L32AWAA	1766-L32BXBA
Input Power	120/240 VAC		24 VDC	120/240 VAC		24 VDC
Memory	non-volatile battery backed RAM					
User Program / User Data Space	10 K / 10K configurable					
Data Logging / Recipe Storage	128 K (without Recipe) / up to 64 K (after subtracting Data Logging)					
Battery Back-up	Yes					
Back-up Memory Module	Yes					
Digital Inputs	(12) Fast 24VDC (8) Normal 24VDC	(20) 120VAC	(12) Fast 24VDC (8) Normal 24VDC	(12) Fast 24VDC (8) Normal 24VDC	(20) 120VAC	(12) Fast 24VDC (8) Normal 24VDC
Digital Outputs	(12) Relay	(12) Relay	(6) Relay (3) Fast DC (3) Normal DC	(12) Relay	(12) Relay	(6) Relay (3) Fast DC (3) Normal DC
Analog Inputs / Outputs	None			(4) Voltage Inputs / (2) Voltage Outputs		
Serial Ports	(1)RS232C/RS485*, (1)RS232C**					
Serial Protocols	DF1 Full Duplex, DF1 Half Duplex Master/Slave, DF1 Radio Modem, DH-485, Modbus RTU Master/Slave, ASCII, DNP 3 Slave					
Ethernet Ports	(1) 10/100 EtherNet/IP port					
Ethernet Protocols	EtherNet/IP messaging only					
Trim Potentiometers	2 Digital					
High-Speed Inputs	Up to 6 channels @ 100 kHz	N/A	Up to 6 channels @ 100 kHz	Up to 6 channels @ 100 kHz	N/A	Up to 6 channels @ 100 kHz
Real Time Clock	Yes, embedded					
PID	Yes (limited by loop and stack memory)					
PWM /PTO	N/A		3 channel PTO (100kHz)\PWM (40kHz)	N/A		3 channel PTO (100kHz)\PWM (40kHz)
Embedded LCD	Yes					
Floating Point Math	Yes					
Online Editing	Yes					
Operating Temperature	-20°C to +60°C					
Storage Temperature	-40°C (or -30°C) to +85°C					

* Isolated. RS232/RS485 combo port. Same as MicroLogix 1100 Comm 0
** Non-isolated RS232. standard D-sub connector.

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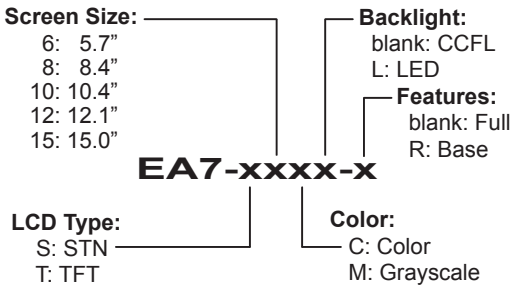
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C-more Operator Panels Overview

Touch Panel Part Number Key:



Getting started

Installing the software and configuring the *C-more* panel is simple. You will need the following to successfully connect and configure a project for the panel:

- ***C-more*** touch panel - 6", 8", 10", 12" or 15" model
- ***C-more*** Programming Software, p/n EA-PGMSW
- ***C-more*** programming cable, USB or Ethernet
- 24 VDC switching power supply (min. 1.5A, switching) or the optional ***C-more*** AC Power Adapter
- Personal Computer - to run ***C-more*** programming software
- PLC communications cable (serial or Ethernet) to connect the ***C-more*** Touch Panel to your controller

Part Number	Description	Price
EA7-S6M-R	6-inch ***C-more*** grayscale STN touch panel (5.7 inch viewable screen), 15 shades of gray, 320 x 240 pixel QVGA screen resolution, 333 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP65 (when mounted correctly; for indoor use only), non-replaceable backlight, 50,000 hour half-life. *Base Model: Built-in USB, no Ethernet or Compact Flash support.	<--->
EA7-T6CL-R	6-inch ***C-more*** color TFT touch panel (5.7 inch viewable screen), 64K colors, 320 x 240 pixel QVGA screen resolution, 333 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP65 (when mounted correctly; for indoor use only), non-replaceable LED backlight, 50,000 hour half-life. Built-in USB, no Ethernet or Compact Flash support.	<--->
EA7-S6M	6-inch ***C-more*** grayscale STN touch panel (5.7 inch viewable screen), 15 shades of gray, 320 x 240 pixel QVGA screen resolution, 333 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP65 (when mounted correctly; for indoor use only), non-replaceable backlight, 50,000 hour half-life. Built-in Ethernet and USB; supports Compact Flash.	<--->
EA7-T6CL	6-inch ***C-more*** color TFT touch panel (5.7 inch viewable screen), 64K colors, 320 x 240 pixel QVGA screen resolution, 333 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP65 (when mounted correctly; for indoor use only), non-replaceable LED backlight, 50,000 hour half-life. Built-in Ethernet and USB; supports Compact Flash.	<--->
EA7-T8C	8-inch ***C-more*** color TFT touch panel (8.4 inch viewable screen), 64K colors, 640 x 480 pixel VGA screen resolution, 400 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP65 (when mounted correctly; for indoor use only), user replaceable backlight, 50,000 hour half-life. Built-in Ethernet and USB; supports Compact Flash.	<--->
EA7-T10C	10-inch ***C-more*** color TFT touch panel (10.4 inch viewable screen), 64K colors, 640 x 480 pixel VGA screen resolution, 400 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP65 (when mounted correctly; for indoor use only), user replaceable backlight, 50,000 hour half-life. Built-in Ethernet and USB; supports CompactFlash.	<--->
EA7-T12C	12-inch ***C-more*** color TFT touch panel (12.1 inch viewable screen), 64K colors, 800 x 600 pixel SVGA screen resolution, 400 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP65 (when mounted correctly; for indoor use only), user replaceable backlight, 50,000 hour half-life. Built-in Ethernet and USB; supports CompactFlash.	<--->
EA7-T15C	15-inch ***C-more*** color TFT touch panel (15.0 inch viewable screen), 64K colors, 1024 x 768 XGA screen resolution, 400 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP65 (when mounted correctly; for indoor use only), user replaceable backlight, 50,000 hour half-life. Built-in Ethernet and USB; supports CompactFlash.	<--->
EA-PGMSW	***C-more*** touch panel Windows-based configuration software. Requires Windows 2000 (Service Pack 4), XP Home or Professional (Service Pack 2) or Vista. Includes software installation guide and CD-ROM. Requires USB 1.1 or Ethernet connection to touch panel. Cables sold separately.	<--->
USB-CBL-AB3	Standard 3-ft. (0.9m) USB 2.0 cable, A-type connector to B-type connector, used to connect personal computer to any ***C-more*** touch panel for setup and programming. (Note: Touch panels require a 24 VDC power source for configuration and operation.)	<--->
USB-CBL-AB6	Standard 6-ft. (1.8m) USB 2.0 cable, A-type connector to B-type connector, used to connect personal computer to any ***C-more*** touch panel for setup and programming. (Note: Touch panels require a 24 VDC power source for configuration and operation.)	<--->
USB-CBL-AB10	Standard 10-ft (3 meter) USB 2.0 cable, A-type connector to B-type connector, used to connect personal computer to any ***C-more*** touch panel for setup and programming. (Note: Touch panels require a 24 VDC power source for configuration and operation.)	<--->
USB-CBL-AB15	Standard 15-ft. (4.6m) USB 2.0 cable, A-type connector to B-type connector, used to connect personal computer to any ***C-more*** touch panel for setup and programming. (Note: Touch panels require a 24 VDC power source for configuration and operation.)	<--->

C-more Selection Guide & Specifications

Specification \ Model	6" STN grayscale w/ base features	6" TFT color w/ base features	6" STN grayscale w/ full features	6" TFT color w/ full features
Part Number	***EA7-S6M-R***	***EA7-T6CL-R***	***EA7-S6M***	***EA7-T6CL***
				
Price	<--->	<--->	<--->	<--->
Display Actual Size and Type	5.7" STN grayscale	5.7" TFT color	5.7" STN grayscale	5.7" TFT color
Color Scale	15 shades of gray	65,536 colors	15 shades of gray	65,536 colors
Display Viewing Area	4.54" x 3.4" [115.2 mm x 86.4 mm]			
Screen Pixels	320 x 240 (QVGA)			
Display Brightness	150 cd/m² (NITS)	270 cd/m² (NITS)	150 cd/m² (NITS)	270 cd/m² (NITS)
LCD Panel Dot Pitch	0.36 mm x 0.36 mm			
Backlight Average Lifetime*	Approximately 50,000 hours			
Backlight User Replaceable	No			
Touch Panel Type	Analog Resistive (10-bit resolution, 1024 x 1024 touch area)			
CPU Type	32-Bit RISC CPU (333 MHz)			
Battery	Replaceable battery – ADC Part # D2-BAT-1 (Manufacturer Part # CR2354)			
System Memory	SDRAM 32 MBytes			
System Flash Memory	FLASH 32 MBytes			
Backup Memory (SRAM)	Control data backup memory (SRAM) 256 KBytes			
Logging Data Memory	USB Pen Drive p/n SDCZ4-2048-A10 (Optional)		CompactFlash Memory Card p/n EA-CF-CARD, industrial grade, high speed (Optional) or USB Pen Drive p/n SDCZ4-2048-A10 (Optional)	
Number of Screens	Up to 9999 with ver. 2.40 and later – limited by project memory (10 MBytes)			
Realtime Clock	Built into panel (PLC clock is still accessible if available)			
Calendar – Month/Day/Year	Yes - battery backup			
Screen Saver	Yes, backlight turns off after a 30–1500 minute adjustable time, or can be disabled			
Serial PLC Interface	Serial PLC Port: RS-232/422/485 15-Pin D-sub (female)			
USB Port – Type B	Download/Program – USB Port – type B (ver. 1.2)			
USB Port – Type A	Port for USB device options – type A (ver. 1.2)			
Ethernet Port	not available		Ethernet 10/100 Base-T	
Audio Line Out	not available		Audio Line Out, 1 Volt rms, stereo – requires amplifier and speaker(s)	
CF Card – Slot #1	not available		Optional: CompactFlash Memory Card p/n EA-CF-CARD, industrial grade, high speed, CF slot #1 located on top side of touch panel.	
Expansion Assembly (p/n EA-EXP-OPT)	not available		Optional: Use the CF Card Interface Module p/n EA-CF-IF in the right slot of the Expansion Assembly for installing CF card - Slot #2. The left slot of the Expansion Assembly is for future options.	
Supply Power	24 VDC, -15%, +20% (20.4–28.8 VDC oper. range) (Use AC Power Adapter, p/n EA-AC, to power panel from a 100-240 VAC, 50/60 Hz. power source.)			
Power Consumption	9W @ 24 VDC	9 W @ 24 VDC	10 W @ 24 VDC	11 W @ 24 VDC
Recommended Input Fuse	3.0 A DC slow blow			
Operating Temperature	0 to 50 °C (32 to 122 °F); Maximum surrounding air temperature rating: 50 °C (122 °F)			
Storage Temperature	–20 to +60°C (–4 to +140°F)			
Humidity	10–85% RH, non-condensing			
Noise Immunity	Noise voltage: 1,000 Vp-p, Pulse width: 1 µs, Rise time: 1 ns			
Withstand Voltage	1,000 VDC for 1 minute, between DC power supply input terminal and safety ground			
Insulation Resistance	Over 20 MΩ between DC power supply input terminal and safety ground			
Vibration	IEC61131-2 compliant, 10–57 Hz: 0.075 mm amplitude, 57–150 Hz 1.0 G: 10 sweep cycles per axis on each of 3 mutually perpendicular axes			
Shock	15 G peak, 11 ms duration, 2 shocks per axis, on 3 mutually perpendicular axes			
Enclosure	IP65 Meets UL Type 4X when mounted correctly. For indoor use only.			
Environment	For use in Pollution Degree 2 Environment			
Agency Approvals	UL, cUL, CE; UL file 157382			
Dimensions	6.140" x 8.047" x 1.697" [156.0 mm x 204.4 mm x 43.1 mm]			
Weight	1.46 lb. [660 g]	1.43 lb. [650 g]	1.50 lb. [680 g]	1.48 lb. [670 g]

**** NOTE: The backlight average lifetime is defined as the average usage time it takes before the brightness becomes 50% of the initial brightness. The lifetime of the backlight depends on the ambient temperature. The lifetime will decrease under low or high temperature usage.***

C-more 6" STN Grayscale Touch Panel - Base Model

Part No. EA7-S6M-R

6-inch *C-more* grayscale STN touch panel (5.7 inch viewable screen), 15 shades of gray, 320 x 240 pixel QVGA screen resolution, 333 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP-65 (when mounted correctly; for indoor use only), non-replaceable backlight, 50,000 hour half-life. *Base Model: Built-in USB, no Ethernet or Compact Flash support.



Features

- 5.7" diagonal color STN (Super Twisted Nematic) LCD display with 15 shades of gray
- 320 x 240 pixel resolution
- 150 NITS display brightness
- 50,000 hour average backlight lifetime
- Analog resistive (1024 X 1024) touch screen allowing unlimited touch areas
- USB port B (program/download) and USB port A (USB device options)
- Serial PLC interface (RS-232/422/485)
- 24 VDC powered, 110 VAC power adapter (optional)
- 10 MByte project memory
- 0 to 50°C (32 to 122°F) operating temperature range
- NEMA 4/4X, IP65 compliant when mounted correctly, indoor use only
- Slim design saves panel space
- UL, cUL & CE agency approvals
- 2-year warranty from date of purchase

Function	Available	Associated Features
Ethernet	No	FTP - Email - Web Server
USB	Yes	Data Logging
Compact Flash	No	Data Logging/Project
Expansion Assembly	No	CF Module & future modules
Audio Out	No	Speaker/Amplifier Connection
Ethernet	No	Remote access over internet

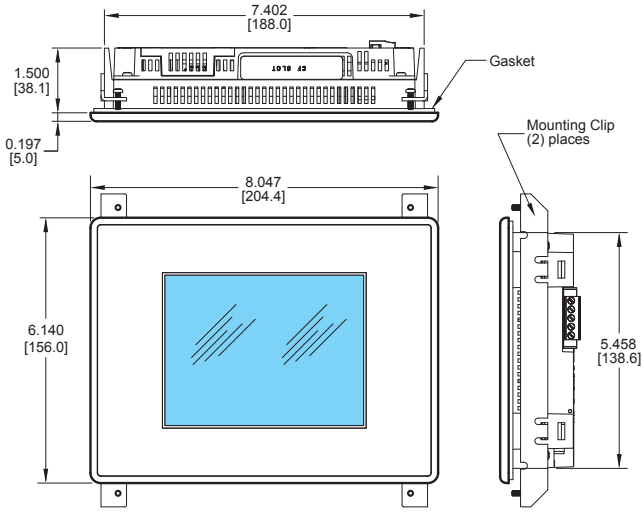
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PLC Drivers	
Serial	**Avail.**
AutomationDirect CLICK	Yes
Direct LOGIC K-sequence	Yes
Direct NET	Yes
Modbus (Koyo Addressing)	Yes
Allen-Bradley DF1 Full & Half Duplex	Yes
Allen-Bradley PLC5 DF1	Yes
Allen-Bradley DH-485	Yes
Allen-Bradley DF1 Full & Half Duplex - Tag Based (ControlLogix™ and CompactLogix™)	Yes
Modbus RTU	Yes
Entivity Modbus RTU	Yes
GE SNPX (90/30, 90/70), Micro 90, VersaMax Micro)	Yes
Omron Host Link C200 Adapter C500	Yes
Omron FINS (CJ1, CS1)	Yes
Mitsubishi FX	Yes
Mitsubishi Q02, Q02H, Q06H, Q12H, Q25H	Yes
Mitsubishi Q, QnA Serial	Yes
Siemens PPI (S7-200 CPU)	Yes

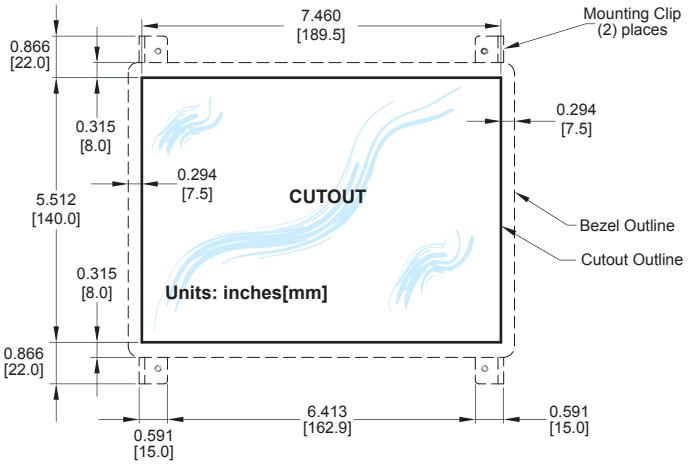
NOTE: The EA7-S6M-R and EA7-T6CL-R units do not support Ethernet.

Dimensions

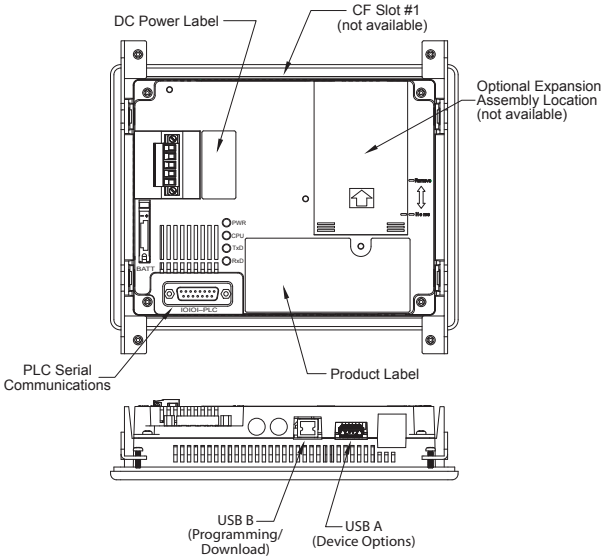
inches / [mm]



Mounting Cutout



Ports & Memory Expansion



C-more 6" TFT Color Touch Panel - Base Model

Part No. EA7-T6CL-R

Base model 6-inch *C-more* color TFT touch panel (5.7 inch viewable screen), 64K colors, 320 x 240 pixel QVGA screen resolution, 333 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP65 (when mounted correctly; for indoor use only), non-replaceable LED backlight, 50,000 hour half-life. Built-in USB, no Ethernet or Compact Flash support.



Features

- 5.7" diagonal color TFT (Thin Film Transfer) LCD display with 64K colors
- 320 x 240 pixel resolution
- 270 NITS display brightness
- 50,000 hour average backlight lifetime
- Analog resistive (1024 X 1024) touch screen allowing unlimited touch areas
- USB port B (program/download) and USB port A (USB device options)
- Serial PLC interface (RS-232/422/485)
- 24 VDC powered, 110 VAC power adapter (optional)
- 10 MByte project memory
- 0 to 50°C (32 to 122°F) operating temperature range
- NEMA 4/4X, IP65 compliant when mounted correctly, indoor use only
- Slim design saves panel space
- UL, cUL & CE agency approvals
- 2-year warranty from date of purchase

Function	*Available*	*Associated Features*
Ethernet	*No*	*FTP - Email - Web Server*
USB	*Yes*	*Data Logging*
Compact Flash	*No*	*Data Logging/Project*
Expansion Assembly	*No*	*CF Module & future modules*
Audio Out	*No*	*Speaker/Amplifier Connection*
Ethernet	*No*	*Remote access over internet*

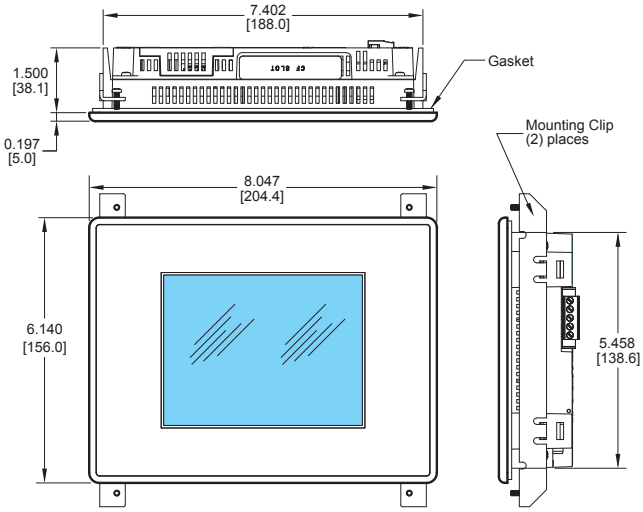
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PLC Drivers	
Serial	***Avail.***
AutomationDirect CLICK	Yes
Direct LOGIC K-sequence	Yes
Direct NET	Yes
Modbus (Koyo Addressing)	Yes
Allen-Bradley DF1 Full & Half Duplex	Yes
Allen-Bradley PLC5 DF1	Yes
Allen-Bradley DH-485	Yes
Allen-Bradley DF1 Full & Half Duplex - Tag Based (ControlLogix™ and CompactLogix™)	Yes
Modbus RTU	Yes
Entivity Modbus RTU	Yes
GE SNPX (90/30, 90/70), Micro 90, VersaMax Micro)	Yes
Omron Host Link C200 Adapter C500	Yes
Omron FINS (CJ1, CS1)	Yes
Mitsubishi FX	Yes
Mitsubishi Q02, Q02H, Q06H, Q12H, Q25H	Yes
Mitsubishi Q, QnA Serial	Yes
Siemens PPI (S7-200 CPU)	Yes

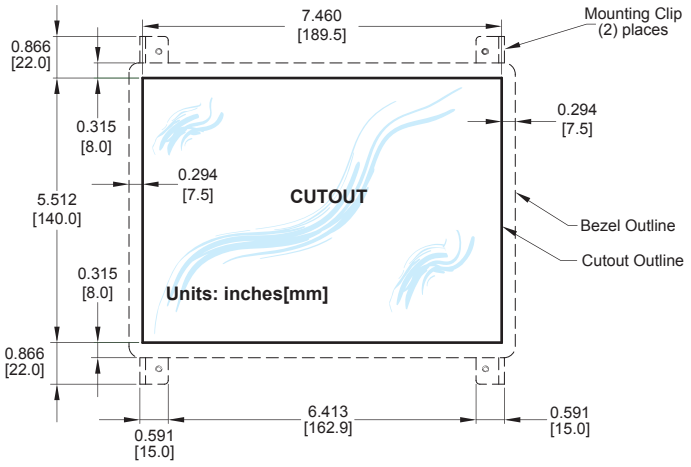
NOTE: The EA7-S6M-R and EA7-T6CL-R units do not support Ethernet.

Dimensions

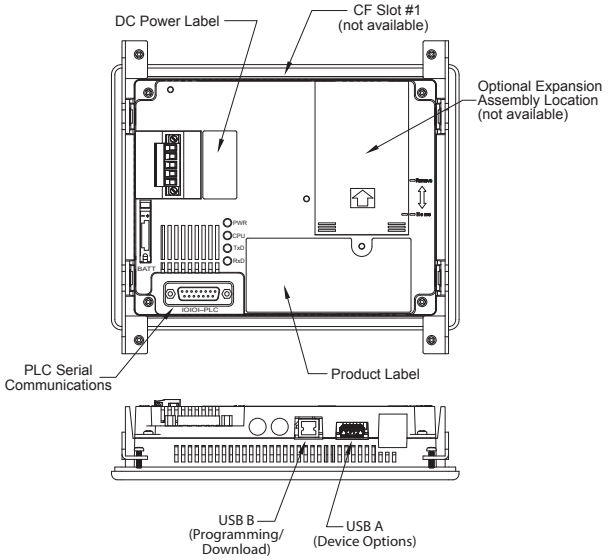
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Mounting Cutout



Ports & Memory Expansion



C-more 6" STN Grayscale Touch Panel - Full Model

Part No. EA7-S6M

6-inch *C-more* grayscale STN touch panel (5.7 inch viewable screen), 15 shades of gray, 320 x 240 pixel QVGA screen resolution, 333 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP-65 (when mounted correctly; for indoor use only), non-replaceable backlight, 50,000 hour half-life. Built-in Ethernet and USB; supports Compact Flash.



<---->

Features

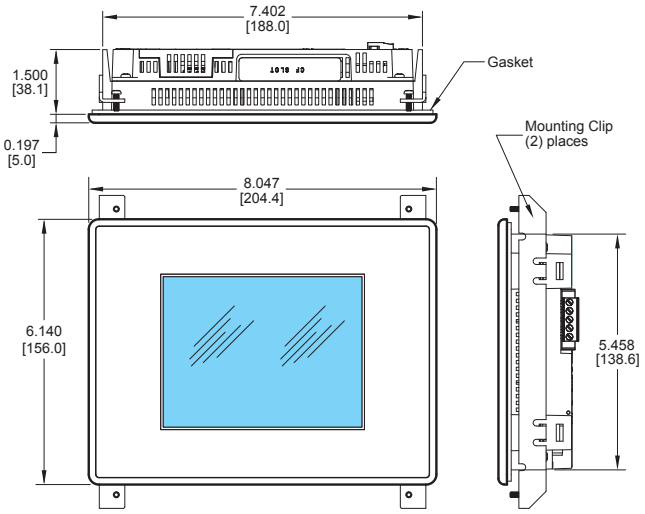
- 5.7" diagonal color STN (Super Twisted Nematic) LCD display with 15 shades of gray
- 320 x 240 pixel resolution
- 150 NITS display brightness
- 50,000 hour average backlight lifetime
- Analog resistive (1024 X 1024) touch screen allowing unlimited touch areas
- USB port B (program/download) and USB port A (USB device options)
- Ethernet 10/100 Base-T port (program/download & PLC comm)
- Remote Internet Access
- Serial PLC interface (RS-232/422/485)
- CompactFlash card slot, built-in
- Expansion assembly (optional) for CompactFlash devices (use with optional CF Card Interface Module)
- 24 VDC powered, 110 VAC power adapter (optional)
- Audio Line Out, stereo - requires amplifier and speaker(s)
- 10 MByte project memory
- Data logging
- 0 to 50°C (32 to 122°F) operating temperature range
- NEMA 4/4X, IP65 compliant when mounted correctly, indoor use only
- Slim design saves panel space
- UL, cUL & CE agency approvals
- 2-year warranty from date of purchase

Function	Available	Associated Features
Ethernet	Yes	FTP - Email - Web Server
USB	Yes	Data Logging
Compact Flash	Yes	Data Logging/Project
Expansion Assembly	Yes	CF Module & future modules
Audio Out	Yes	Speaker/Amplifier Connection
Ethernet	Yes	Remote access over Internet

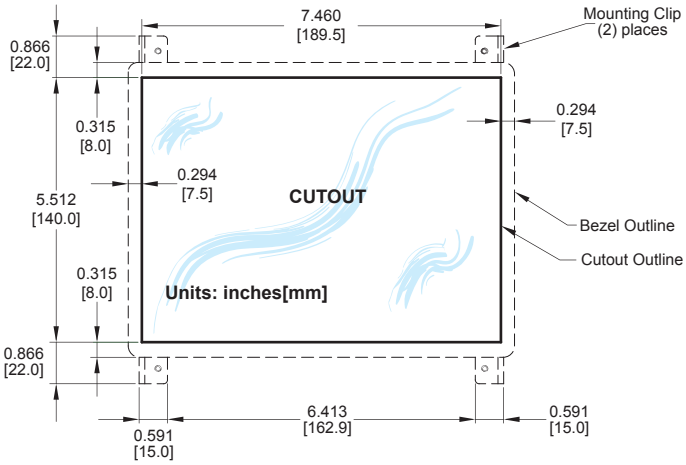
PLC Drivers	
Serial	**Avail.**
AutomationDirect CLICK	Yes
Direct LOGIC K-sequence	Yes
Direct NET	Yes
Modbus (Koyo Addressing)	Yes
Allen-Bradley DF1 Full & Half Duplex	Yes
Allen-Bradley PLC5 DF1	Yes
Allen-Bradley DH-485	Yes
Allen-Bradley DF1 Full & Half Duplex - Tag Based (ControlLogix™ and CompactLogix™)	Yes
Modbus RTU	Yes
Entivity Modbus RTU	Yes
GE SNPX (90/30, 90/70), Micro 90, VersaMax Micro)	Yes
Omron Host Link C200 Adapter C500	Yes
Omron FINS (CJ1, CS1)	Yes
Mitsubishi FX	Yes
Mitsubishi Q02, Q02H, Q06H, Q12H, Q25H	Yes
Mitsubishi Q, QnA Serial	Yes
Siemens PPI (S7-200 CPU)	Yes
Ethernet	
Direct LOGIC Ethernet	Yes
Modbus TCP/IP	Yes
Entivity Modbus TCP/IP	Yes
Allen-Bradley EtherNet/IP™ Server - Generic I/O Messaging*	Yes
Allen-Bradley EtherNet/IP Client - Tag Based (ControlLogix™ and CompactLogix™)	Yes
Allen-Bradley EtherNet/IP Client - MicroLogix 1100 & SLC 5/05 via native Ethernet port; MicroLogix 1000, 1100, 1200, 1400, 1500 & SLC 5-03, 04, 05 via AB ENI Adapter	Yes
Omron FINS	Yes
Mitsubishi Q, QnA Ethernet	Yes
Siemens (S7-200 CPU, S7-300 CPU)	Yes

Dimensions

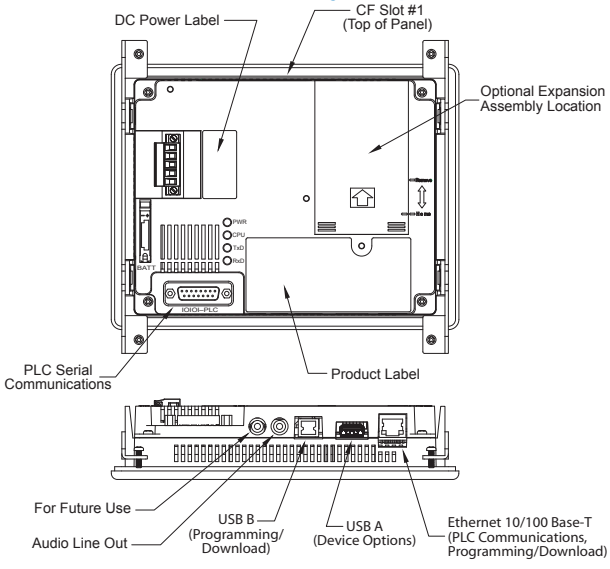
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Mounting Cutout



Ports & Memory Expansion



C-more 6" TFT Color Touch Panel - Full Model

Part No. EA7-T6CL

6-inch *C-more* color TFT touch panel (5.7 inch viewable screen), 64K colors, 320 x 240 pixel QVGA screen resolution, 333 MHz CPU, 24 VDC (20.4-28.8 VDC operating range), NEMA 4/4X, IP65 (when mounted correctly; for indoor use only), non-replaceable LED backlight, 50,000 hour half-life. Built-in Ethernet and USB; supports Compact Flash.



Features

- 5.7" diagonal color TFT (Thin Film Transfer) LCD display with 64K colors
- 320 x 240 pixel resolution
- 270 NITS display brightness
- 50,000 hour average backlight lifetime
- Analog resistive (1024 X 1024) touch screen allowing unlimited touch areas
- USB port B (program/download) and USB port A (USB device options)
- Ethernet 10/100 Base-T port (program/download & PLC comm)
- Remote Internet Access
- Serial PLC interface (RS-232/422/485)
- 1 GByte CompactFlash card slot, built-in
- Expansion assembly (optional) for CompactFlash devices (use with optional CF Card Interface Module)
- 24 VDC powered, 110 VAC power adapter (optional)
- Audio Line Out, stereo - requires amplifier and speaker(s)
- 10 MByte project memory
- Data logging
- 0 to 50°C (32 to 122°F) operating temperature range
- NEMA 4/4X, IP65 compliant when mounted correctly, indoor use only
- Slim design saves panel space
- UL, cUL & CE agency approvals
- 2-year warranty from date of purchase

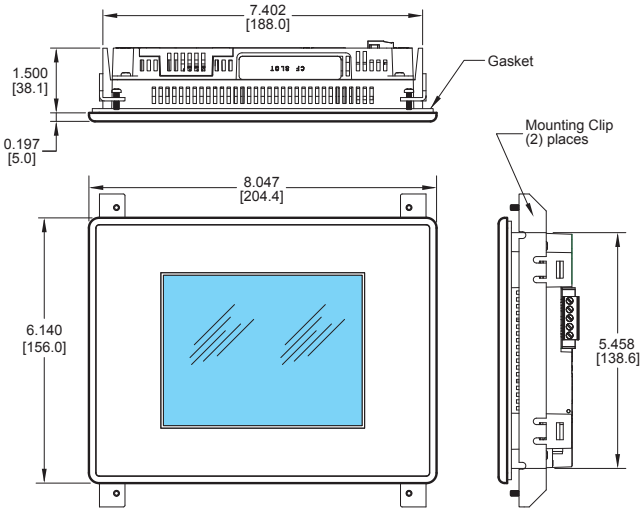
Function	*Available*	*Associated Features*
Ethernet	*Yes*	*FTP - Email - Web Server*
USB	*Yes*	*Data Logging*
Compact Flash	*Yes*	*Data Logging/Project*
Expansion Assembly	*Yes*	*CF Module & future modules*
Audio Out	*Yes*	*Speaker/Amplifier Connection*
Ethernet	*Yes*	*Remote access over Internet*

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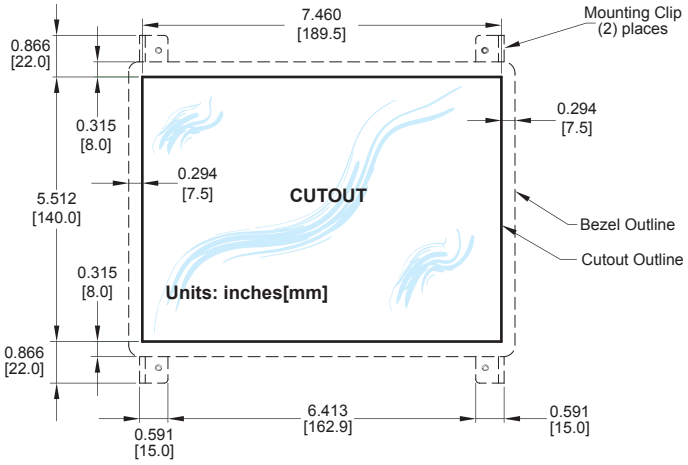
PLC Drivers	
Serial	***Avail.***
AutomationDirect CLICK	Yes
Direct LOGIC K-sequence	Yes
Direct NET	Yes
Modbus (Koyo Addressing)	Yes
Allen-Bradley DF1 Full & Half Duplex	Yes
Allen-Bradley PLC5 DF1	Yes
Allen-Bradley DH-485	Yes
Allen-Bradley DF1 Full & Half Duplex - Tag Based (ControlLogix™ and CompactLogix™)	Yes
Modbus RTU	Yes
Entivity Modbus RTU	Yes
GE SNPX (90/30, 90/70), Micro 90, VersaMax Micro)	Yes
Omron Host Link C200 Adapter C500	Yes
Omron FINS (CJ1, CS1)	Yes
Mitsubishi FX	Yes
Mitsubishi Q02, Q02H, Q06H, Q12H, Q25H	Yes
Mitsubishi Q, QnA Serial	Yes
Siemens PPI (S7-200 CPU)	Yes
Ethernet	
Direct LOGIC Ethernet	Yes
Modbus TCP/IP	Yes
Entivity Modbus TCP/IP	Yes
Allen-Bradley EtherNet/IP™ Server - Generic I/O Messaging*	Yes
Allen-Bradley EtherNet/IP Client - Tag Based (ControlLogix™ and CompactLogix™)	Yes
Allen-Bradley EtherNet/IP Client - MicroLogix 1100 & SLC 5/05 via native Ethernet port; MicroLogix 1000, 1100, 1200, 1400, 1500 & SLC 5-03, 04, 05 via AB ENI Adapter	Yes
Omron FINS	Yes
Mitsubishi Q, QnA Ethernet	Yes
Siemens (S7-200 CPU, S7-300 CPU)	Yes

Dimensions

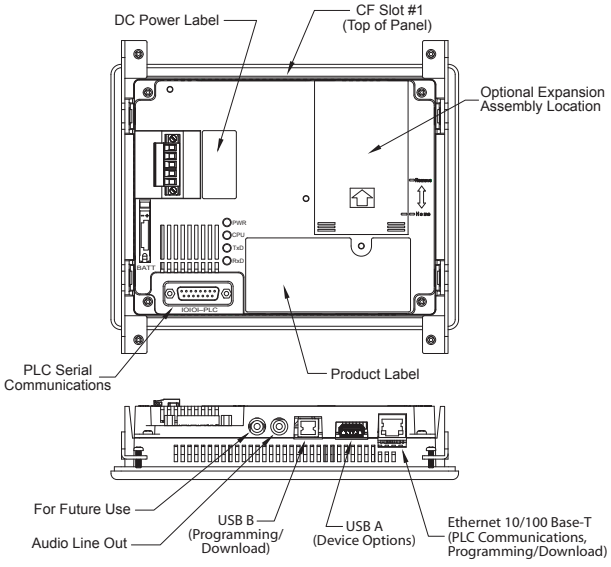
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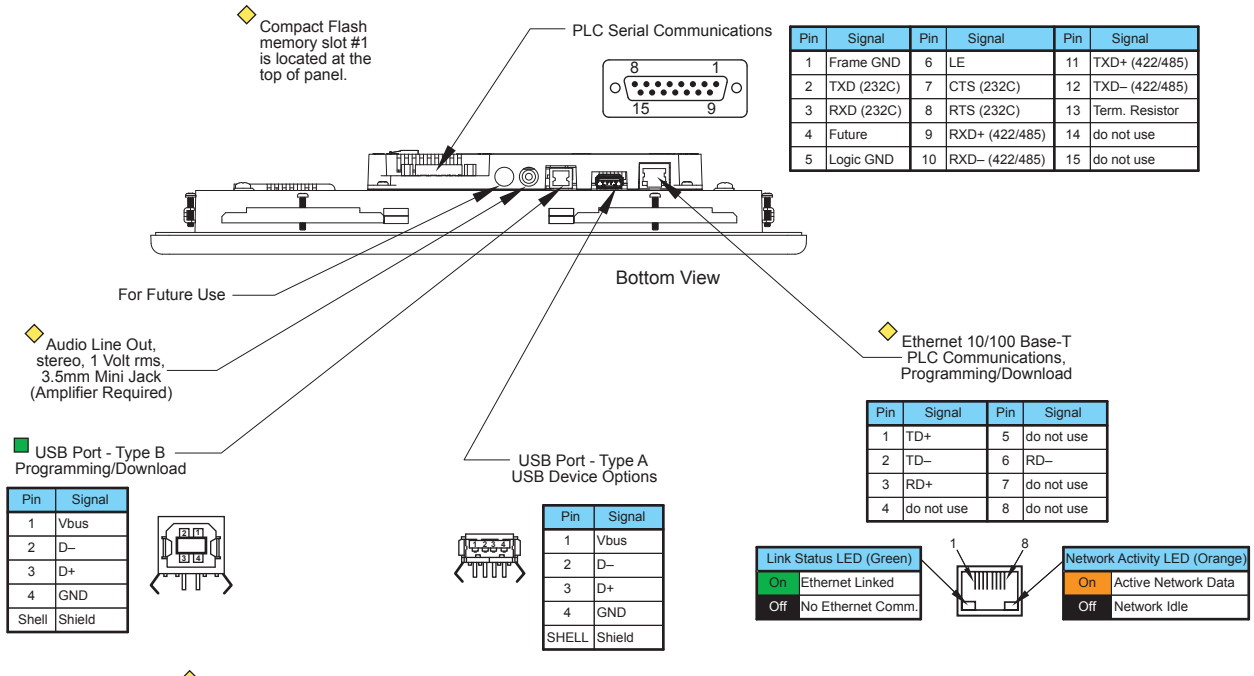
Mounting Cutout



Ports & Memory Expansion



C-more Communication Ports



Pin	Signal	Pin	Signal	Pin	Signal
1	Frame GND	6	LE	11	TXD+ (422/485)
2	TXD (232C)	7	CTS (232C)	12	TXD– (422/485)
3	RXD (232C)	8	RTS (232C)	13	Term. Resistor
4	Future	9	RXD+ (422/485)	14	do not use
5	Logic GND	10	RXD– (422/485)	15	do not use

Pin	Signal
1	Vbus
2	D–
3	D+
4	GND
Shell	Shield

Pin	Signal
1	Vbus
2	D–
3	D+
4	GND
SHELL	Shield

Pin	Signal	Pin	Signal
1	TD+	5	do not use
2	TD–	6	RD–
3	RD+	7	do not use
4	do not use	8	do not use

Note: Device is not available on Base Feature touch panels, part numbers EA7-S6M-R and EA7-T6CL-R.

Note: Use USB Programming Cable, such as p/n USB-CBL-AB15.

Ethernet Port

The Ethernet port has several uses:

- Download program to panel
- Communicate to PLCs/PCs
- Send e-mail
- Access FTP server
- Act as a Web server
- Remote Internet Access

The Ethernet port has an RJ-45 8-wire modular connector with green and orange LEDs.

- The orange LED indicates the Ethernet communication status. It illuminates when there is data activity on the network.
- The green LED indicates link status and illuminates when a link is established.

Ethernet connections:

- Productivity3000
- ***Direct***LOGIC Ethernet
- Modbus TCP/IP
- Allen-Bradley EtherNet/IP™ Server - Generic I/O Messaging (ControlLogix™, CompactLogix™, and FlexLogix™)
- Allen-Bradley EhterNet/IP Client - Tag Based (ControlLogix, CompactLogix, and FlexLogix™)
- Allen-Bradley EtherNet/IP Client - MicroLogix 1100 & SLC 5/05, both via native Ethernet port
- Allen-Bradley MicroLogix 1000, 1100, 1200, 1500, SLC 5-03/04/05, all via ENI Adapter
- Entivity Modbus TCP/IP
- Omron Ethernet FINS
- Siemens Ethernet ISO over TCP

Note: The base panels (-R part numbers) do not include an Ethernet port, and do not have these capabilities.

USB Port B

Program *C-more* via the USB programming port. It's fast and easy, with no baud rate settings, parity, or stop bits to worry about. We stock standard USB cables for your convenience. USB Port B can be used to upload or download projects to and from a PC.

USB Port A

The Universal Serial Bus (USB) Port A is a standard feature for all models and can be used to connect various USB HID (Human Input Device) devices to the panel, such as:

- USB pen drives, (SDCZ4-2048-A10)
- USB keyboards
- USB barcode scanners
- USB card scanners

C-more can log data to the USB pen drive as well as load projects to the panel from the pen drive. You can also back up project files and panel firmware.

Sound Interface (Audio Line Out)

When attached to an amplifier and speaker(s), *C-more* can play warning sounds or pre-recorded messages such as: "conveyor is jammed". *C-more* supports WAV type files. The output is stereo.

Serial Port

The serial port is an RS-232, RS-422 or RS-485 female 15-pin D-sub connector. Use this port for serial connections to PLCs. The port supports the following PLC protocols:

All AutomationDirect.com PLCs:
- Productivity3000
- ***Direct***LOGIC K-sequence
- ***Direct***NET
- Modbus (Koyo Addressing)
- CLICK

Allen Bradley:
- DF1 Full & Half Duplex
- DF1 Full & Half Duplex - Tag Based
- PLC5 DF1
- DH485

Modbus RTU
Entivity Modbus RTU
GE SNPX (90/30, 90/70, Micro 90, VersaMax Micro)
Omron:
- Host Link (C200 Adapter, C500)
- FINS (CJ1, CS1)

Mitsubishi:
- Melsec FX
- Q/QnA

Siemens PPI (S7-200 CPU)

C-more Communication Protocols & Cables

Compatibility Table			
PLC Family	**Model**		**Protocols**
Allen-Bradley	MicroLogix 1000/1100/1200/1400/1500, SLC 5-/01/02/03, PLC5		DH485/AIC/AIC+
	MicroLogix 1000, 1100, 1200 and 1500		DF1 Half Duplex; DF1 Full Duplex
	SLC 5-/03/04/05		
	ControlLogix™, CompactLogix™, FlexLogix™		
	PLC-5		DF1 Full Duplex
	ControlLogix, CompactLogix, FlexLogix - Tag Based		DF1 Half Duplex; DF1 Full Duplex
	ControlLogix, CompactLogix, FlexLogix - Generic I/O Messaging		EtherNet/IP Server
	ControlLogix, CompactLogix, FlexLogix - Tag Based		EtherNet/IP Client
	MicroLogix 1100 & SLC 5/05, both via native Ethernet port		
	MicroLogix 1000, 1100, 1200, 1400,1500 & SLC 5-03/04/05, all via ENI Adapter		
Modbus TCP/IP	Modbus TCP/IP devices		Modbus TCP/IP
GE	90/30, 90/70, Micro 90, VersaMax Micro		SNPX
Mitsubishi	FX Series		FX Direct
	Q02, Q02H, Q06H, Q12H, Q25H		Q CPU
	Q, QnA Serial		QnA Serial
	Q, Qna Ethernet		QnA Ethernet
Omron	C200 Adapter, C500		Host Link
	CJ1/CS1 Serial, CJ1/CS1 Ethernet		FINS
Modicon	984 CPU, Quantum 113 CPU, AEG Modicon Micro Series 110 CPU: 311-xx, 411-xx, 512-xx, 612-xx		Modbus RTU
Siemens	S7-200 CPU, RS-485 Serial		PPI
	S7-200 CPU, S7-300 CPU; Ethernet		Ethernet ISO over TCP
Productivity3000	Productivity3000 Serial (P3-550)		AutomationDirect Prod. 3000 Serial
	Productivity3000 Ethernet (P3-550)		AutomationDirect Prod. 3000 Ethernet
CLICK	all		AutomationDirect Modbus (CLICK)
***Direct*LOGIC**	DL05/DL06	all	K-Sequence
			***Direct*NET**
			Modbus (Koyo addressing)
		H0-ECOM/H0-ECOM100	***Direct*LOGIC Ethernet**
	DL105	all	K-Sequence
	DL205	D2-230	K-Sequence
		D2-240	K-Sequence
			***Direct*NET**
		D2-250/D2-250-1/D2-260	K-Sequence
			***Direct*NET**
			Modbus (Koyo addressing)
		D2-240/D2-250-1/D2-260 Using DCM	***Direct*NET**
			Modbus (Koyo addressing)
		H2-ECOM/H2-ECOM100	***Direct*LOGIC Ethernet**
	DL305	D3-330/330P (Requires the use of a Data Communications Unit)	***Direct*NET**
		D3-340	***Direct*NET**
		D3-350	K-Sequence
			***Direct*NET**
			Modbus (Koyo addressing)
		D3-350 DCM	***Direct*NET**
			Modbus (Koyo addressing)
	DL405	D4-430	K-Sequence
			***Direct*NET**
		D4-440	K-Sequence
			***Direct*NET**
		D4-450	K-Sequence
			***Direct*NET**
			Modbus (Koyo addressing)
		All with DCM	***Direct*NET**
			Modbus (Koyo addressing)
		H4-ECOM/H4-ECOM100	***Direct*LOGIC Ethernet**
	H2-WinPLC (Think & Do) Live V5.2 or later and Studio any version		Think & Do Modbus RTU (serial port)
	H2-WinPLC (Think & Do) Live V5.5.1 or later and Studio V7.2.1 or later		Think & Do Modbus TCP/IP (Ethernet port)

Cable Description	Cable Part Number	Price
AutomationDirect CLICK, ***Direct*LOGIC PLC RJ-12 port, DL05, DL06, DL105, DL205, D3-350, D4-450 & H2-WinPLC (RS-232C)	***EA-2CBL***	<--->
Direct*LOGIC (VGA Style) 15-pin port, DL06, D2-250 (250-1), D2-260 (RS-232C)	***EA-2CBL-1	<--->
Direct*LOGIC PLC RJ-11 port, D3-340 (RS-232C)	***EA-3CBL	<--->
Direct*LOGIC DL405 PLC 15-pin D-sub port, DL405 (RS-232C)	***EA-4CBL-1	<--->
Direct*LOGIC PLC 25-pin D-sub port, DL405, D3-350, DL305 DCU and all DCM's (RS-232C)	***EA-4CBL-2	<--->
Allen-Bradley MicroLogix 1000, 1100, 1200, 1400 & 1500 (RS-232C)	***EA-MLOGIX-CBL***	<--->
Allen-Bradley SLC 5-03/04/05 ControlLogix, CompactLogix, FlexLogix, DF1 port (RS-232C)	***EA-SLC-232-CBL***	<--->
Allen-Bradley PLC-5 DF1 port (RS-232C)	***EA-PLC5-232-CBL***	<--->
Allen-Bradley SLC 500 DH485 port (RS-485A)	***EA-DH485-CBL***	<--->
GE 90/30, 90/70, Micro 90, VersaMax Micro 15-pin D-sub port (RS-422A)	***EA-90-30-CBL***	<--->
MITSUBISHI FX Series 25-pin port (RS-422A)	***EA-MITSU-CBL***	<--->
MITSUBISHI FX Series 8-pin mini-DIN (RS-422A)	***EA-MITSU-CBL-1***	<--->
OMRON Host Link C200 Adapter, C500 (RS-232C)	***EA-OMRON-CBL***	<--->

NOTE: EZTouch serial PLC communication cables are compatible with C-more touch panels.

EA-2CBL



EA-2CBL-1



C-more Computer Programming Connections

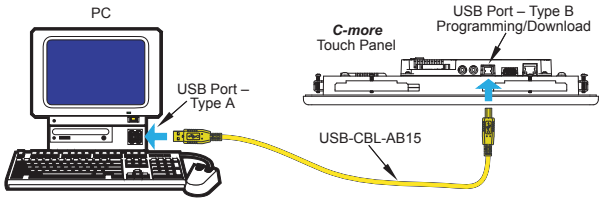
Using the *C-more* Programming Software for project development, the touch panel can be connected to a PC (personal computer) in one of several ways:

- Connect a USB Programming Cable such as (USB-CBL-AB15) from a USB port type A on the PC to the USB type B programming port on the C-more touch panel. The USB connection is for direct connection only and does not support USB hubs.
- Connect the ***C-more*** touch panel to a PC via an Ethernet hub or switch, and CAT5 Ethernet cables (full feature panels only). Multiple panels can be programmed in this configuration.
- Use an Ethernet crossover cable directly between the ***C-more*** touch panel's Ethernet port and the PC Ethernet port (full feature panels only).

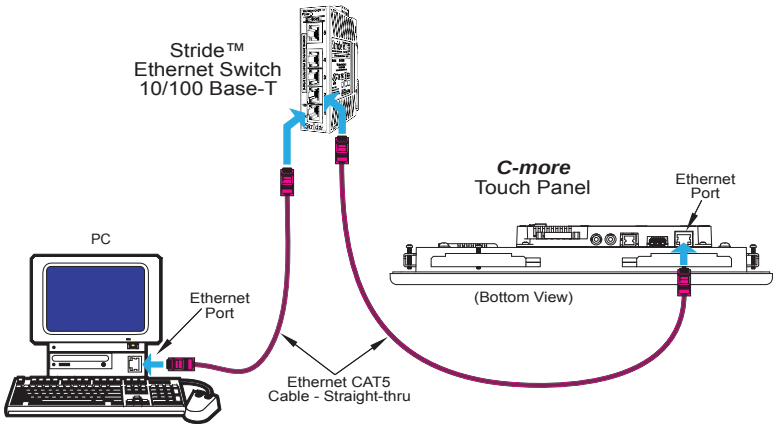
Following are the minimum system requirements for running *C-more* Programming Software, p/n EA-PGMSW, on a PC:

- Personal Computer with a 333 MHz or higher processor (CPU) clock speed recommended; Intel® Pentium/Celeron family, or AMD® K6/Athlon/Duron family, or compatible processor recommended
- Keyboard and Mouse or compatible pointing device
- Super VGA color video adapter and monitor with at least 800 x 600 pixels resolution (1024 x 768 pixels recommended) 64K color minimum
- 300 MB free hard-disk space
- 128 MB free RAM (512 MB recommended); 512 MB free RAM (1 GB recommended) for Vista
- CD-ROM or DVD drive for installing software from the CD
- USB port or Ethernet 10/100 Mbps port for project transfer from software to touch panel (Ethernet port not available on -R models)
- Operating System - Windows® Vista, Windows® XP Home / Professional Edition or Windows® 2000 with Service Pack 4.

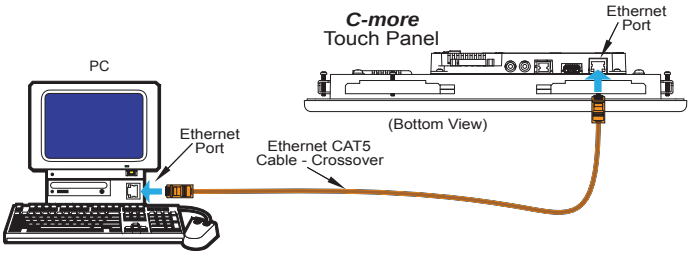
USB Connectivity



Ethernet Connectivity via a Hub or Switch



Ethernet Direct Connection



USB Programming Cable



Part No. USB-CBL-AB15

<--->

Other lengths available see USB-CBL-AB3, USB-CBL-AB6, USB-CBL-AB10 on page 9-27

Stride™ Ethernet Switch



Part No. SE-SW5U

<--->

Ethernet Configuration Kit



Part No. RT-CNFGKIT

<--->

The Ethernet Configuration Kit includes a five-port 10/100 Base-T Ethernet switch, four straight-through cables, and one crossover cable. (The cables are at least five feet in length.) The kit provides a great convenience for configuring systems, demonstration systems or basic control projects using Ethernet.

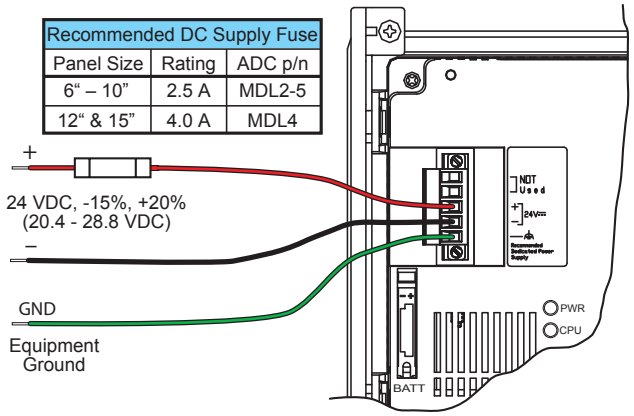
C-more Power Connection Wiring

Providing Power to the Touch Panel

- Connect a dedicated 24 VDC switching power supply rated for a minimum of 1.5 Amps to the DC connector on the rear of the ***C-more*** touch panel. Connect the ground terminal to a proper equipment ground.
- or, install a ***C-more*** AC Power Adapter (EA-AC) to the rear of the touch panel and connect an AC voltage source of 100-240 VAC, 50/60Hertz, to its AC connector.
- then, turn on the power source and check the LED status indicators on the rear of the ***C-more*** touch panel for proper operation.

DC Wiring

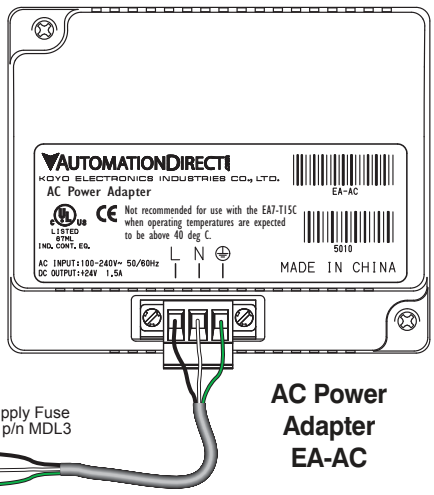
Recommended DC Supply Fuse		
Panel Size	Rating	ADC p/n
6" – 10"	2.5 A	MDL2-5
12" & 15"	4.0 A	MDL4



Recommended Power Supply:
AutomationDirect Part No. PS24-050D

Tightening Torque	
Power supply cable torque	71 - 85 oz-in (0.5 - 0.6 Nm)
Power connector mounting torque	71 - 85 oz-in (0.5 - 0.6 Nm)
Mounting flange screw torque	57 - 71 oz-in (0.4 - 0.5 Nm)

AC Wiring



Recommended AC Supply Fuse
3.0 A time delay, ADC p/n MDL3

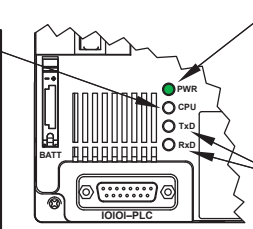
100 - 240 VAC
50/60 Hz

AC Power Adapter EA-AC

NOTE: The AC/DC Power Adapter is not recommended for use with the EA7-T15C touch panel when operating temperatures are expected to exceed 40 °C [104 °F].

C-more LED Status Indicators

CPU Status LED (Green, Orange & Red)	
Off	Power Off
Green	Normal – CPU Run State
Red	Memory Error
Blinking Red	Operating System not found
Blinking Orange	LCD Backlight Failure
Blinking Green	Power Loss Detection



Power LED (Green)	
On	Power On
Off	Power Off

Serial TxD/RxD LED (Green)	
On	Comm. is active
Off	No communication

Rear View

WARNING: To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and it is your responsibility to determine which codes should be followed, and to verify that the equipment, installation, and operation are in compliance with the latest revision of these codes.

Equipment damage or serious injury to personnel can result from the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication are suitable for your particular application, nor do we assume any responsibility for your product design, installation, or operation.

If you have any questions concerning the installation or operation of this equipment, or if you need additional information, please call us at 1-800-633-0405 or 770-844-4200.

This publication is based on information that was available at the time it was printed.

At Automationdirect.com® we constantly strive to improve our products and services, so we reserve the right to make changes to the products and/or publications at any time without notice and without obligation. This publication may also discuss features that may not be available in certain revisions of the product.

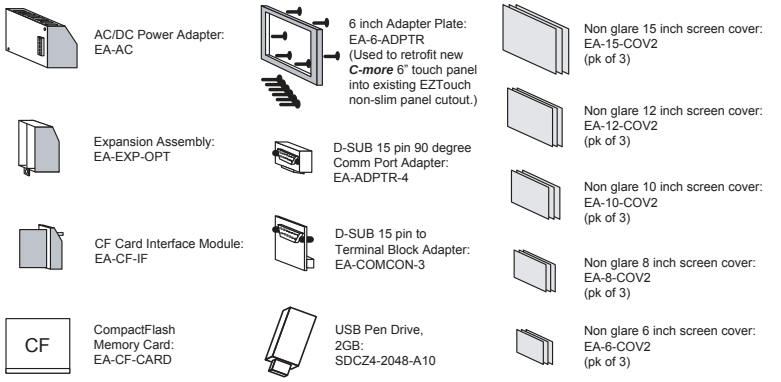
C-more Accessories

Accessories

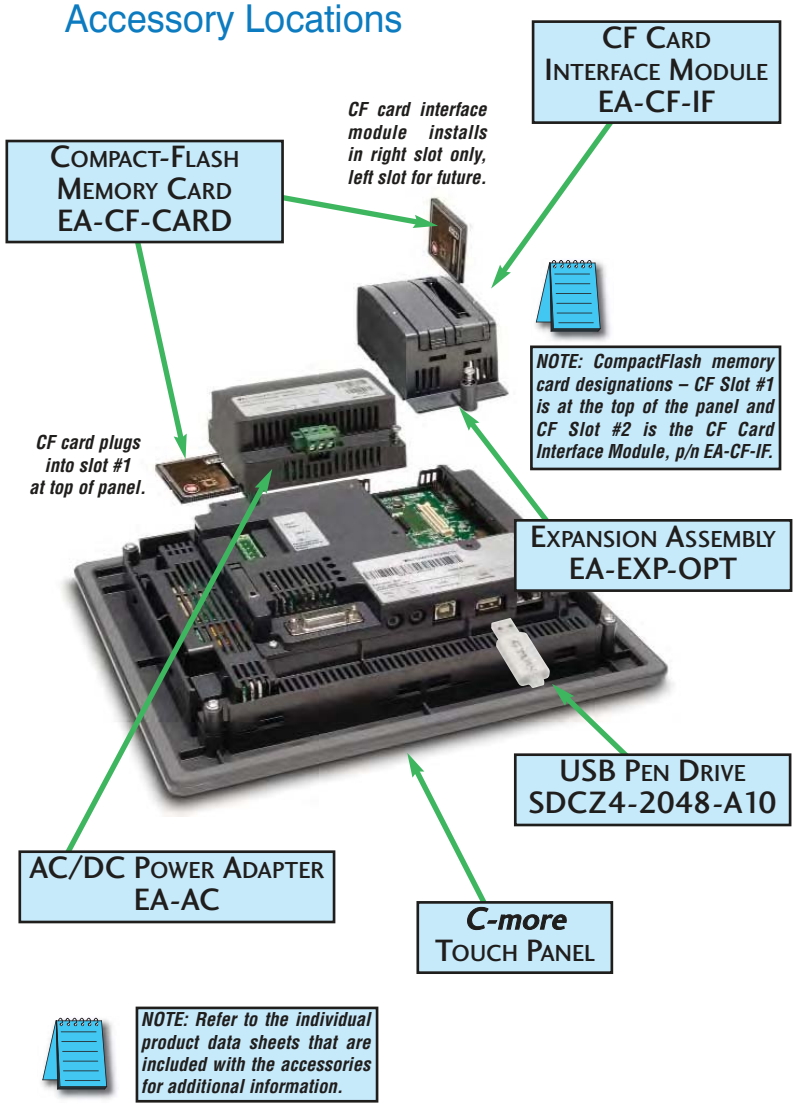
The *C-more* touch panels can be enhanced with the accessories below:

Part Number	Description	Price
EA-AC	The AC/DC Power Adapter, EA-AC, is for ***C-more*** touch panels only, and is powered from a 100-240 VAC, 50/60 Hertz power source. The adapter provides 24 VDC @ 1.5 A. Power Fault features help protect data being logged to CompactFlash during power failures. The ***C-more*** panel must have firmware version 1.21 Build 6.18E or higher for proper operation.	<--->
EA-EXP-OPT	***C-more*** I/O Module Expansion Assembly, used to hold secondary CompactFlash Adapter (EA-CF-IF) and future option modules	<--->
EA-CF-IF	CompactFlash Card Adapter Module, used when adding secondary CompactFlash option to Expansion Assembly. Compatible with EA-CF-CARD Compact-Flash memory card accessory.	<--->
EA-CF-CARD	512 MB CompactFlash Memory Option, industrial grade, high speed memory for non-volatile storage.	<--->
EA-6-ADPTR	6-inch mounting adapter plate, REQUIRED to mount a 6 inch ***C-more*** touch panel into enclosures with legacy wide-bezel EZTouch cutouts. Converts a 8.932 inch x 6.223 inch cutout to 7.522 inch x 5.625 inch cutout.	<--->
EA-ADPTR-4	D-SUB 15-pin 90 degree PLC serial communication port adapter (allows a PLC communication cable to be plugged in at a 90 degree angle to reduce panel depth requirements)	<--->
EA-COMCON-3	D-SUB 15-pin to 6-terminal PLC serial communication port adapter to allow wire terminal connections for RS-422/485 PLC communication cable.	<--->
EA-6-COV2	Non Glare 6 Inch Screen Cover, protective overlay used to protect the touch screen while helping to reduce the glare from external light sources. (pk of 3)	<--->
EA-8-COV2	Non Glare 8 Inch Screen Cover, protective overlay used to protect the touch screen while helping to reduce the glare from external light sources. (pk of 3)	<--->
EA-10-COV2	Non Glare 10-Inch Screen Cover, protective overlay used to protect the touch screen while helping to reduce the glare from external light sources. (pk of 3)	<--->
EA-12-COV2	Non Glare 12-Inch Screen Cover, protective overlay used to protect the touch screen while helping to reduce the glare from external light sources. (pk of 3)	<--->
EA-15-COV2	Non Glare 15-Inch Screen Cover, protective overlay used to protect the touch screen while helping to reduce the glare from external light sources. (pk of 3)	<--->
SDCZ4-2048-A10	USB Pen Drive, 2GB, SanDisk Cruzer micro Pen Drive. Compatible with Windows 98SE, ME, 2000, XP and Mac OS 9.1.x+, OS X 10.1.2+ Certified Windows XP and Mac OS X. Recommended for use with the ***C-more*** Operator Touch Panels.	<--->

Accessories at a glance:



Accessory Locations



C-more Accessories

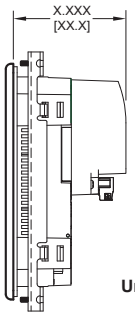
AC/DC Power Adapter

The AC/DC Power Adapter provides dedicated DC power to the panel if using 110 VAC as a power source. The AC/DC Power Adapter provides some features that a normal DC power supply cannot provide. The adapter provides a power loss signal to the touch panel that can be used to track power outages. This signal also allows the touch panel by way of a timed sequence to stop writing data to CompactFlash memory devices providing a controlled shutdown for increased data logging reliability.

Part No. EA-AC <---->



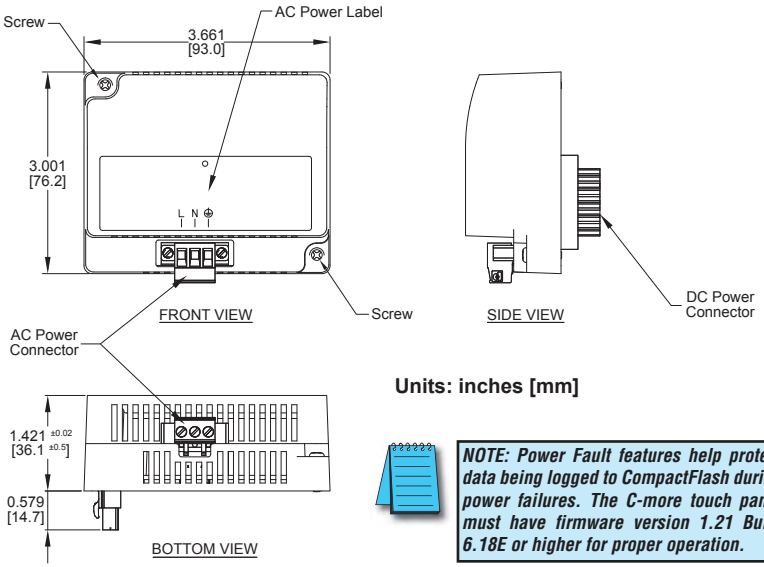
Overall Panel Depth w/ EA-AC Installed



EA7-S6M-R = 2.921 [74.2]
EA7-T6CL-R = 2.921 [74.2]
EA7-S6M = 2.921 [74.2]
EA7-T6CL = 2.921 [74.2]
EA7-T8C = 3.157 [80.2]
EA7-T10C = 3.106 [78.9]
EA7-T12C = 3.102 [78.8]
EA7-T15C = 3.075 [78.1]

Units: inches[mm]

Dimensions



Units: inches [mm]

NOTE: Power Fault features help protect data being logged to CompactFlash during power failures. The C-more touch panel must have firmware version 1.21 Build 6.18E or higher for proper operation.

NOTE: The AC/DC Power Adapter is not recommended for use with the EA7-T15C touch panel when operating temperatures are expected to exceed 40 °C [104 °F].

AC/DC Power Adapter Specifications			
Part Number	EA-AC	***Static Electricity Discharge Resistance***	Compliant with IEC61000-4-2, Contact: 4 kV, Air: 8 kV
Input Voltage & Frequency	100-240 VAC; 50/60 Hertz	***Agency Approvals***	UL508, cUL, CE, EMC EN61132-2
Voltage Range	85-264 VAC w/ Under Voltage and Over Voltage Shutdown	***Environment***	No corrosive gas or conductive dust
Permissible Momentary Power Failure	Within 40 ms	***Grounding***	Ground resistance: less than 100 ohm
Input Power	68 VA or less	***Dimensions - inches [mm]***	3.00" (H) x 3.66" (W) x 1.42" (D) [76.2 mm x 93.0 mm x 36.1 mm] (Excluding DC Power Connector.)
Operating Temperature Range	0 °C to 50 °C [32 to 122 °F] (For the EA7-T15C touch panel, maximum temperature is 40° C [104 °F] for the power adapter.)	***Weight***	6.13 oz. [175 g]
Storage Temperature Range	-20 to 60 °C [-4 to 140 °F]	***Cooling Method***	Natural convection when installed on vertically mounted touch panel.
Operating & Storage Humidity	10-85% RH (non-condensing)	***Included Parts***	AC Power Connector, Data Sheet Insert
Noise Immunity	1000 VAC p-p (Pulse width 1 µs, rise time: 1 ns), with proper ground connection on AC terminal block.	***Removable AC Power Connector***	EA-AC-CON or DECA Switchlab MC101-508-03G Secure with (2) captive M2.5 screws, torque to 70 oz-in [0.5 Nm]
Hi-Pot	1000 VAC, 1 minute, with proper ground connection on AC terminal block.	***Output Voltage and Ripple***	21.6 - 26.4 VDC, Ripple < 100 mV p-p
Insulation Resistance	500 VDC, 10 M ohm or above, with proper ground connection on AC terminal block.	***Output Current***	Maximum 1.5 A
Vibration	Compliant with IEC61131-2	***Inrush Current***	For 100 VAC: 15 A, 3 ms or less For 240 VAC: 20 A, 3 ms or less
Shock	Pulse shape: Sine half wave, Peak acceleration: 147 m/s² (15 G), X, Y, Z: 3 directions, 2 times each	***Power Fail Detection Voltage***	58 VAC ±5%
Thermal Protection	140 °C [284 °F], with autorecovery	***Mounting to Touch Panel***	Secure with (2) spring loaded captive M3-20 screws, torque to 50 oz-in [0.35 Nm]
Short Circuit Protection	85 VAC: 2.6 A, 100 VAC: 2.8 A, 264 VAC: 3.9 A		

C-more Accessories

Expansion Assembly

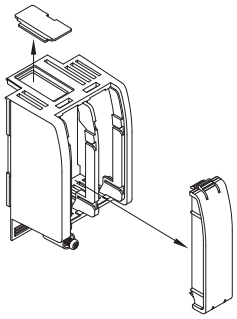
The *C-more* Expansion Assembly allows installation of the optional CF Card Interface Module (shown below) for CF card use and also provides a slot for future option modules. Although the full featured models have a built-in CompactFlash slot, some users may require additional CF memory for data logging.

The optional Expansion Assembly can be installed on the rear of all but the 6-inch base models. This attachable assembly currently allows installation of an additional CompactFlash card with the use of the CF Card Interface Module. More options will be available in the future.

Part No. EA-EXP-OPT



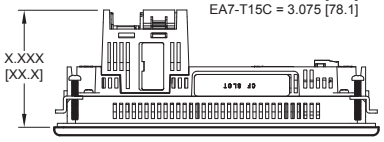
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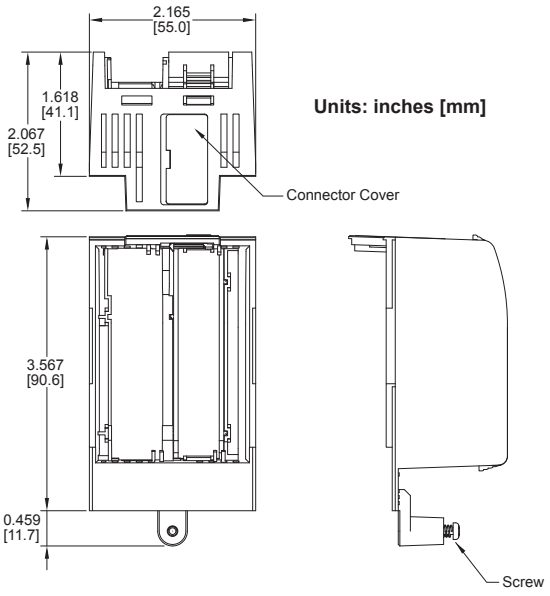
Overall Panel Depth w/ EA-EXP-OPT Installed

Units: inches[mm]

EA7-S6M = 2.921 [74.2]
EA7-T6CL = 2.921 [74.2]
EA7-T8C = 3.157 [80.2]
EA7-T10C = 3.106 [78.9]
EA7-T12C = 3.102 [78.8]
EA7-T15C = 3.075 [78.1]



Dimensions



Units: inches [mm]

CF Card Interface Module

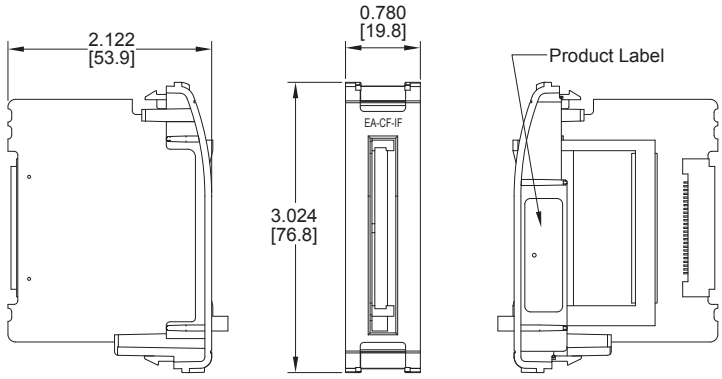
The *C-more* CF Card Interface Module is used with the Expansion Assembly to allow use of standard CompactFlash cards, such as the CompactFlash Memory (EA-CF-CARD). The CF card can be used for data logging or as project backup.

Part No. EA-CF-IF



<---->

Dimensions



Units: inches [mm]

C-more Accessories

512 MB CompactFlash Memory Card

EA-CF-CARD is a 512 MB high speed industrial grade CompactFlash memory card for non-volatile storage. Its 85 °C operating temperature makes it perfect for data logging in industrial applications (recommended for *C-more* touch panels). This is a standard "off the shelf" CompactFlash.

Part No.
EA-CF-CARD



<---->

Specifications/Features:

- CompactFlash™ Compatibility
- W/E Endurance 100,000 cycles
- Data transfer rate: 16 MB/second
- Operating Temp: -13 to 185°F (-25 to 85°C)
- Operating Humidity 85% max, non-condensing
- Storage Temp: -13 to 194 °F (-25 to 90°C)
- Storage Humidity 95% max, non-condensing

USB Pen Drive

Part No.
SDCZ4-2048-A10



<---->

The SanDisk Cruzer Micro is an extremely small 2GB USB Flash Drive (UFD) that connects to a USB port. Users can easily store their logging data, project data, key documents and images on a Cruzer Micro and transfer them to another computer with a USB port.

Specifications/Features:

- Dimensions: 7.9 mm x 18.95 mm x 52.2 mm (H x W x L)
- Stylish, metal casing
- Hi-Speed USB 2.0 certified (backwards compatible with all USB 1.1 ports)
- Compatible with Windows 2000, XP, Vista and Mac OS 9.1.x+, OS X v10.1.2+
- Certified Windows XP and Mac OS X

* For Windows only

C-more Accessories

6” Adapter Plate

The adapter plate simplifies the retrofit of a new *C-more* 6” touch panel into an existing cabinet cutout for an EZTouch (units sold by AutomationDirect) 6” wide bezel touch panel, such as our part number EZ-S6C-K, EZ-S6C-F, EZ-S6M-R or EZ-S6M-F.

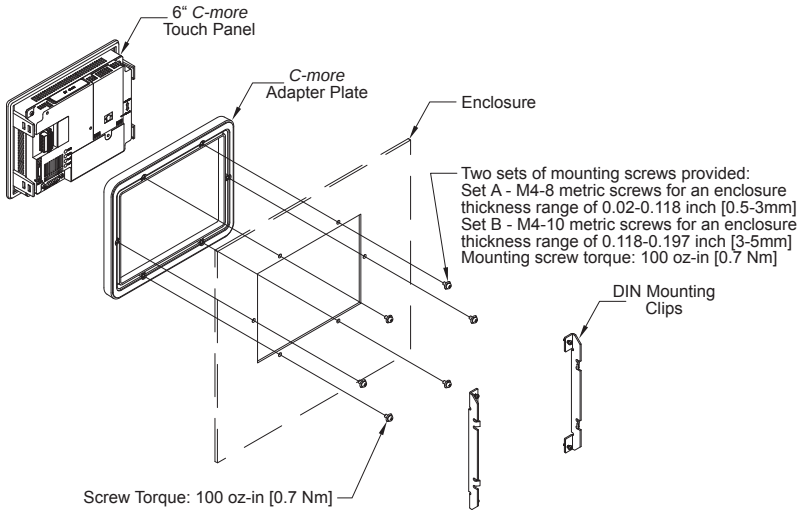
A NEMA 4/4X gasket is included. Please note that all sizes of the *C-more* touch panels have the same cutout as similarly sized EZTouch thin bezel (slim) touch panels, allowing quick replacement.

Part No. EA-6-ADPTR

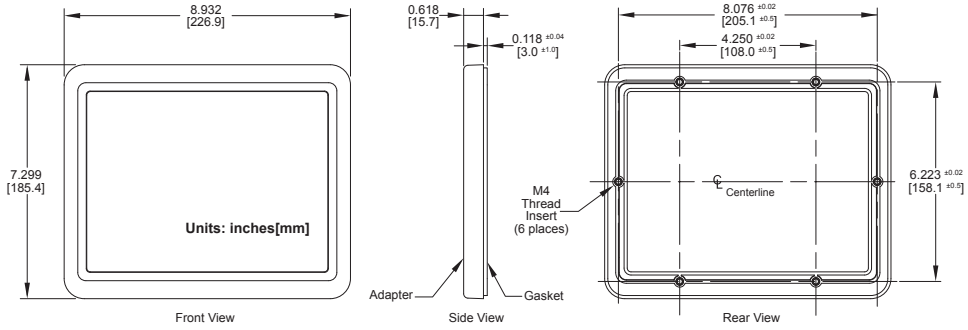


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Mounting Details

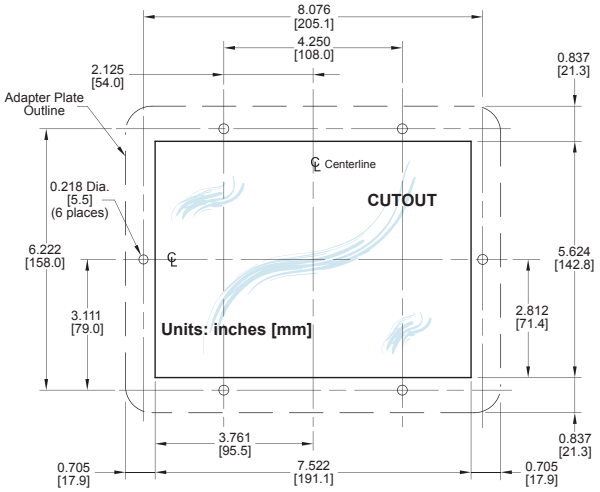


Dimensions





Cutout Dimensions



C-more Accessories

D-SUB 15-pin 90-degree Communication Port Adapter

The EA-ADPTR-4 adapter plugs into the 15-pin serial port on the rear of the panel to allow a PLC communication cable to be plugged in at a 90 degree angle to reduce panel depth requirements. 15-pin straight through pin-out. UL Recognized.

Part No.
EA-ADPTR-4



<---->

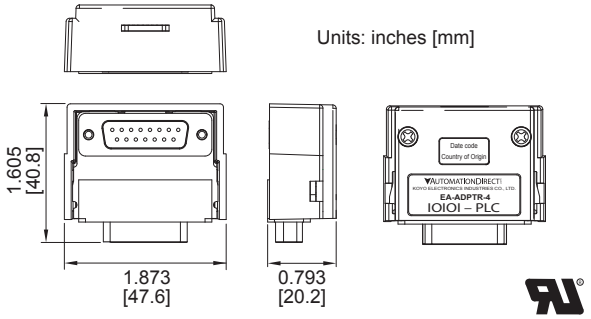


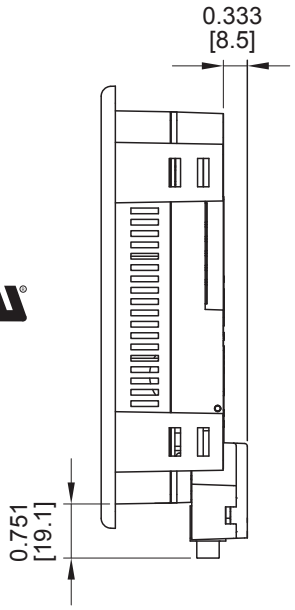




Dimensions

Units: inches [mm]





D-SUB 15-pin to Terminal Block Adapter

The EA-COMCON-3 adapter plugs into the 15-pin serial port on the rear of the panel to allow wire terminal connections for an RS-422/RS-485/DH-485 PLC communication cable. UL Recognized.

Part No.
EA-COMCON-3



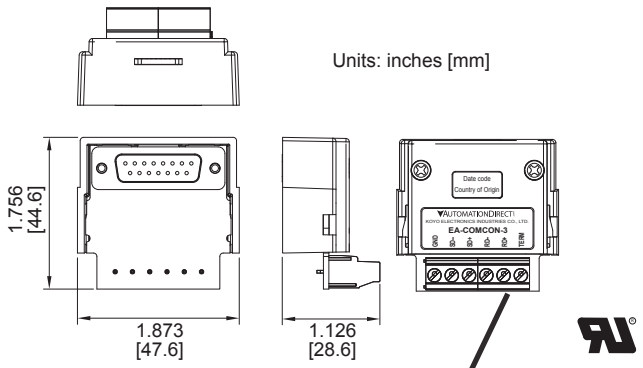
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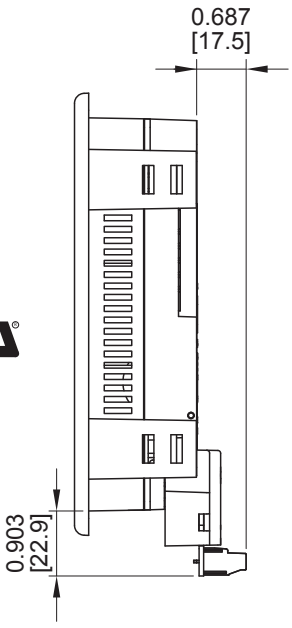




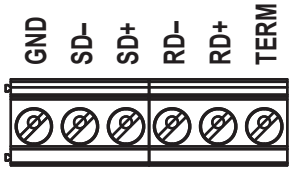
Dimensions

Units: inches [mm]





Terminals

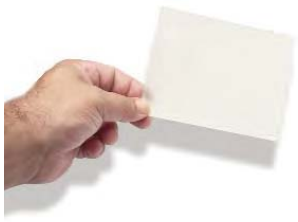


C-more Accessories

Non-glare Screen Covers (in packages of 3)

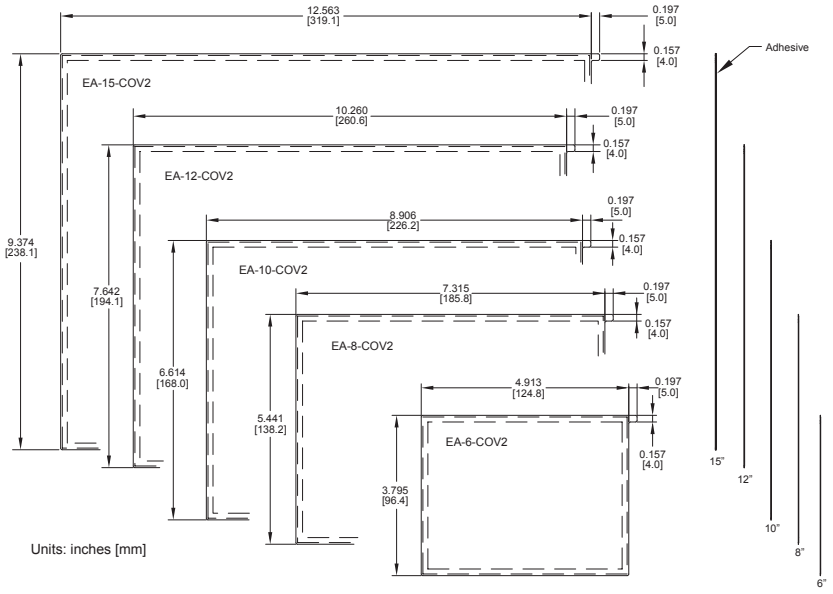
The non-glare screen covers are protective overlays used to protect the touch screen while helping to reduce the glare from external light sources.

Part Nos. EA-6-COV2, EA-8-COV2, EA-10-COV2, EA-12-COV2 and EA-15-COV2



EA-6-COV2 <--->
EA-8-COV2 <--->
EA-10-COV2 <--->
EA-12-COV2 <--->
EA-15-COV2 <--->

Dimensions



Units: inches [mm]

Installation



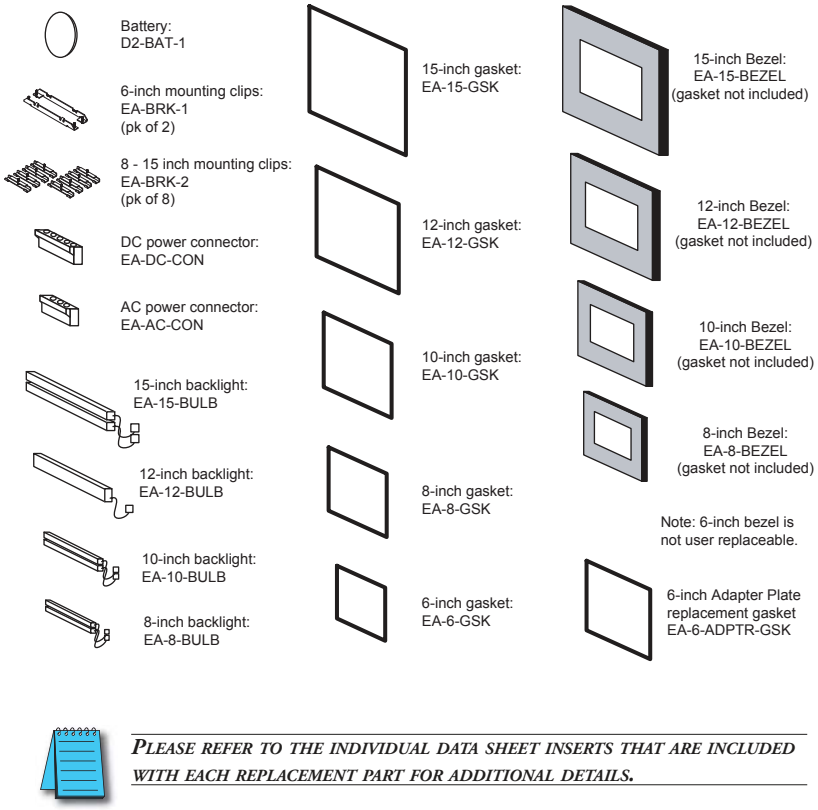
NOTE: The Protective Cover ships with a thin protective sheet on the face of the cover that needs to be carefully removed. If your panel is not clear, the protective sheet may not have been removed.

C-more Replacement Parts

The optional replacement parts can be used to replace damaged, worn or lost *C-more* components.

Part Number	Description	Price
D2-BAT-1	Replacement Battery	<--->
EA-BRK-1	6" Panel Mounting Clip Replacements (2 per pk.)	<--->
EA-BRK-2	8"-15" Panel Mounting Clip Replacements (8 per pk.)	<--->
EA-DC-CON	DC Panel Power Connector Replacement	<--->
EA-AC-CON	AC Power Adapter Connector Replacement	<--->
EA-15-BULB	15" Panel Backlight Bulb Replacement	<--->
EA-12-BULB	12" Panel Backlight Bulb Replacement	<--->
EA-10-BULB	10" Panel Backlight Bulb Replacement	<--->
EA-8-BULB	8" Panel Backlight Bulb Replacement	<--->
EA-15-GSK	15" Panel Gasket Replacement	<--->
EA-12-GSK	12" Panel Gasket Replacement	<--->
EA-10-GSK	10" Panel Gasket Replacement	<--->
EA-8-GSK	8" Panel Gasket Replacement	<--->
EA-6-GSK	6" Panel Gasket Replacement	<--->
EA-15-BEZEL	15" Panel Bezel Replacement	<--->
EA-12-BEZEL	12" Panel Bezel Replacement	<--->
EA-10-BEZEL	10" Panel Bezel Replacement	<--->
EA-8-BEZEL	8" Panel Bezel Replacement	<--->
EA-6-ADPTR-GSK	6" Adapter Plate Gasket Replacement	<--->

Replacement parts at a glance:



PLEASE REFER TO THE INDIVIDUAL DATA SHEET INSERTS THAT ARE INCLUDED WITH EACH REPLACEMENT PART FOR ADDITIONAL DETAILS.

Replacement Battery Part No. D2-BAT-1



Backup Battery (supplied with new panels)

C-more panels use battery backed RAM to store retentive values for internal tags. This battery will last for up to two years, and is easy to replace. You can even set up an alarm condition, and let *C-more* remind you when the battery needs replacing. The *C-more* panels come with the D2-BAT-1 already installed.

NOTE: The D2-BAT-1 is the same battery used in our DL06, D2-250(-1), D2-260 and D3-350 PLC products.

6" Panel Mounting Clips Part No. EA-BRK-1



Spare panel mounting clips for 6-inch *C-more* touch panels. Package of 2 clips with 4 screws.

8"-15" Panel Mounting Clips Part No. EA-BRK-2



Spare panel mounting clips for the 8-inch through 15-inch *C-more* touch panels. Package of 8 clips with 8 screws.

CAUTION - The battery used in this device may present a risk of fire or chemical burn if mistreated. Do not recharge, disassemble, heat above 100 °C (212 °F) or incinerate. Replace battery with AutomationDirect part number D2-BAT-1 or CR2354 only. Use of another battery may present a risk of fire or explosion. Dispose of used battery properly. Keep away from children.

Perchlorate Material, special disposal handling may apply.

C-more Replacement Parts

MAINTENANCE AND ACCESSORY INSTRUCTION SHEETS CAN BE VIEWED AND DOWNLOADED ONLINE AT: HTTP://WWW.AUTOMATIONDIRECT.COM/STATIC/MANUALS/EAUSERM/EAUSERM.HTML

DC Power Connector Part No. EA-DC-CON



Replacement 5-terminal DC power connector for *C-more* touch panels.

AC Power Connector Part No. EA-AC-CON



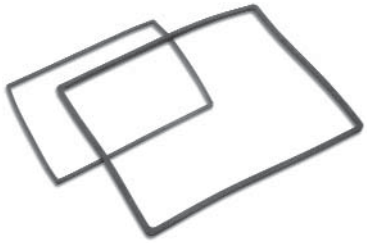
Replacement 3-terminal AC power connector for *C-more* touch panel AC Power Adapters.

Part No. EA-8-BULB, EA-10-BULB, EA-12-BULB and EA-15-BULB



Backlight assembly, customer replaceable, for *C-more* 8", 10", 12" and 15" touch panels. The 8", 10" and 15" touch panels use two bulbs per panel and the 12" touch panels use one bulb per panel. The bulbs are packaged two per box for the 8", 10" and 15" touch panels and one per box for the 12" touch panels.

Part No. EA-6-GSK, EA-8-GSK, EA-10-GSK, EA-12-GSK and EA-15-GSK



Replacement NEMA 4/4X touch panel gaskets for *C-more* 6", 8", 10", 12" and 15" touch panels.

Part No. EA-8-BEZEL, EA-10-BEZEL, EA-12-BEZEL and EA-15-BEZEL



NEMA 4/4X bezel, customer replaceable, for *C-more* 8", 10", 12" and 15" touch panels. Gasket not included.

Part No. EA-6-ADPTR-GSK



6-inch replacement NEMA 4/4X gasket for the *C-more* touch panel adapter plate.

The C-more Family

Features	Base Model	Full Featured Model
More durable		
- 50,000 hour bulb life	y	y
- Replaceable bulbs on 8", 10", 12", and 15" models	-	y
Better screens		
- Bright screens (NIT ratings)	y	y
- TFT with 65,536 colors available on all sizes	y	y
- 15 shade monochrome STN screens on 6" models	y	y
More flexibility		
- Analog touch screen (no touch cell grid!)	y	y
- Overlapping objects	y	y
Better communications		
- USB Port-A	y	y
- USB Port-B	y	y
- Built-in Ethernet port	-	y
- Built-in serial communications	y	y
More capacity		
- Built-in 10Mbyte project memory	y	y
- CompactFlash card slot #1 (data logging)	-	y
- Supports USB memory devices (data logging)	y	y
- Symbol Factory™ library with 4,000 symbols.	y	y
More objects		
- Over 50 objects including 16 pen trends, switches, PID trend faceplate, PID bar graph faceplate	y	y
- Create custom objects and store in user library	y	y
- Improved multilanguage support for objects in German, French, Italian, Spanish, Chinese and Japanese characters	y	y
More high end features		
- Project simulator	y	y
- Bitmap animation	y	y
- E-mail messaging	-	y
- Built-in FTP server	-	y
- Pop-up window within a touch screen	y	y
- Data logging to USB/CompactFlash	USB only	y
- Historical alarms with time and date stamp along with alarm frequency reporting.	y	y
- Supports simultaneous communication to multiple brands of PLC/PACs.	-	y
- Event Manager	y	y
- Audio line out	-	y
Improved ease of use		
- Improved multi-language support.	y	y
- Improved dialog boxes	y	y
- "Power User" property box	y	y
- More fonts and sizes	y	y
- Master background screens	y	y
- Improved recipes	y	y
Optional accessories		
- Optional "Screw on" 110VAC power supply	y	y
- Expansion unit for additional CompactFlash	-	y

Supported drivers

All AutomationDirect.com PLCs and PC based control
K-Sequence (DL05/06/105/205/350/405)
DirectNET (DL05/06/105/205/350/405)
DirectNET (DL330/340)
Modbus (DL05/06/205/350/405)
Modbus (CLICK)
ECOM Ethernet (DL05/06/205/405) Ethernet
Productivity3000 PAC
Think & Do Modbus RTU (H2-WinPLC)
Think & Do Modbus TCP/IP Ethernet (H2-WinPLC)

Modbus RTU
Modbus TCP/IP Ethernet

Allen-Bradley:
AB DF1 Full Duplex (MicroLogix)
AB DF1 Full Duplex (SLC500)
AB DF1 Full Duplex (PLC5)
AB DF1 Full Duplex Tag-Based (ControlLogix/CompactLogix/FlexLogix)
AB DF1 Half Duplex (MicroLogix/SLC500)
AB DF1 Half Duplex Tag-Based (ControlLogix/CompactLogix/FlexLogix)
AB DH485 (MicroLogix/SLC500/AIC)
AB EtherNet/IP Client (MicroLogix 1100)
AB EtherNet/IP Client (SLC5/05/ENI Adapter)
AB EtherNet/IP Client Tag-Based (ControlLogix/CompactLogix/FlexLogix)
AB EtherNet/IP Server Generic IO Messaging (ControlLogix/CompactLogix/FlexLogix)

GE 90/30 and 90/70 SNPX
SNPX (90/30, 90/70, Micro90, VersaMax Micro)

Omron:
Host Link Adapter (C200/C500)
FINS Serial (CS/CJ)
FINS Ethernet (CS/CJ)

Mitsubishi:
FX Series CPU
FX-1N(C), 2N(C), 3U(C) CPU
Q Series (Q02, Q02H, Q06H, Q12H, Q25H CPU)
Q/QnA Serial
Q/QnA Ethernet

Siemens:
S7-200(Serial: PPI)
S7-200(Ethernet: ISO over TCP/IP)
S7-300(Ethernet: ISO over TCP/IP)

Allen-Bradley Tag Import

Import tags directly from the RSLogix 5000 L5K file. *C-more* Software now supports direct insertion of ControlLogix, CompactLogix and FlexLogix tags from the PLC into *C-more* (no mapping or translations required).

EDS-205/208 Series

5 and 8-port entry-level unmanaged Ethernet switches



- 10/100BaseT(X) (RJ45 connector), 100BaseFX (multi-mode, SC/ST connectors)
- IEEE802.3/802.3u/802.3x support
- Broadcast storm protection
- DIN-rail mounting ability
- -10 to 60°C operating temperature range

Introduction

The EDS-205/208 series of industrial Ethernet switches are entry-level industrial 5 and 8-port Ethernet switches that support IEEE 802.3/802.3u/802.3x with 10/100M, full/half-duplex, MDI/MDIX auto-sensing RJ45 ports. The EDS-205/208 switches are rated to operate at temperatures ranging from -10 to 60°C, and are rugged enough for any harsh industrial environment. The switches can be easily installed on a DIN-rail as well as in distribution boxes. The DIN-rail mounting capability, wide operating temperature, and the IP30 housing with LED indicators make the plug-and-play EDS-205/208 switches easy to use and reliable.

Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3x for Flow Control
Processing Type: Store and Forward
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties

MAC Table Size: 1 K
Packet Buffer Size: 512 kbit

Interface

Fiber Ports: 100BaseFX ports (SC/ST connector, multi-mode)
RJ45 Ports: 10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
LED Indicators: Power, 10/100M (TP port), 100M (fiber port)

Optical Fiber

	100BaseFX	
	Multi-mode	Single-mode
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]
Saturation	-6 dBm	-3 dBm

a. 50/125 µm, 800 MHz*km fiber optic cable
b. 62.5/125 µm, 500 MHz*km fiber optic cable
c. 9/125 µm single-mode fiber optic cable

Power Requirements

Input Voltage:
EDS-205: 24 VDC (12 to 48 VDC), 18 to 30 VAC (47 to 63 Hz), single input
EDS-208 Series: 24 VDC (12 to 45 VDC), 18 to 30 VAC (47 to 63 Hz), single input
Input Current:
EDS-205: 0.12 A @ 24 V
EDS-208: 0.14 A @ 24 V
EDS-208-M: 0.23 A @ 24 V
Overload Current Protection: 1.1 A
Connection: 1 removable 3-contact terminal block
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Plastic, IP30 protection
Dimensions:
EDS-205: 24.9 x 100 x 86.5 mm (0.98 x 3.94 x 3.41 in)
EDS-208 Series: 40 x 100 x 86.5 mm (1.57 x 3.94 x 3.41 in)
Weight:
EDS-205: 135 g
EDS-208 Series: 170 g
Installation: DIN-rail mounting

Environmental Limits

Operating Temperature: -10 to 60°C (14 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Standards and Certifications

Safety:
EDS-205: UL 508, EN 60950-1
EDS-208 Series: UL 508
EMI: FCC Part 15 Subpart B Class A, EN 55022 Class A
EMS:
EN 61000-4-2 (ESD) Level 2, EN 61000-4-3 (RS) Level 3,
EN 61000-4-4 (EFT) Level 3, EN 61000-4-5 (Surge) Level 3,
EN 61000-4-6 (CS) Level 3,
EN 61000-4-8, EN 61000-4-11
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (mean time between failures)

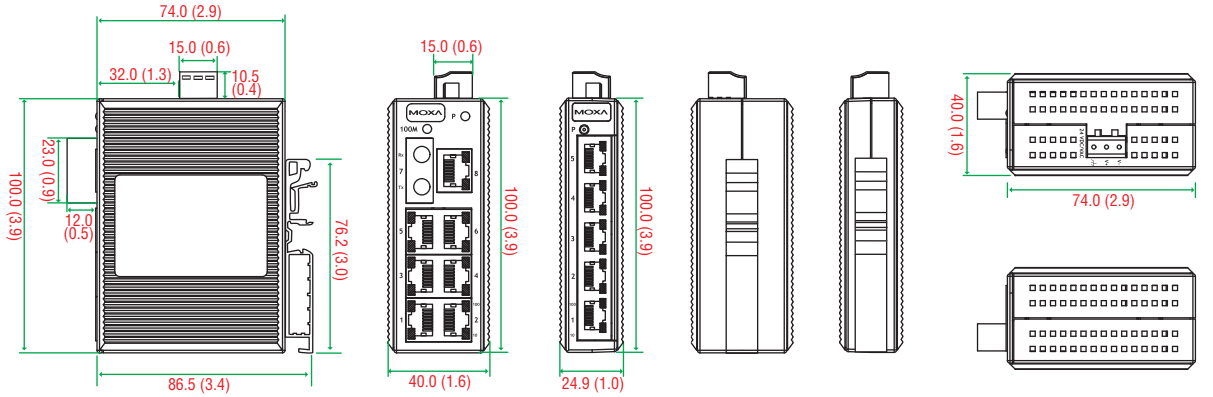
Time:
EDS-205: 3,915,945 hrs
EDS-208 Series: 7,492,000 hrs
Database: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Unit: mm (inch)



Side View | Front View | Rear View | Top & Bottom View

Ordering Information

Available Models	Port Interface			Housing Material	Power Range
Standard Temperature (-10 to 60°C)	10/100BaseT(X)	100BaseFX			
		Multi-mode, SC Connector	Multi-mode, ST Connector		
EDS-205	5	–	–	Plastic	12 to 48 VDC
EDS-208	8	–	–	Plastic	12 to 45 VDC
EDS-208-M-SC	7	1	–	Plastic	12 to 45 VDC
EDS-208-M-ST	7	–	1	Plastic	12 to 45 VDC

Optional Accessories (can be purchased separately)

DR-4524/75-24/120-24: 45/75/120 W DIN-rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-rail 24 VDC power supplies, -20 to 70°C operating temperature
RK-4U: 4U-high 19" rack mounting kit

Package Checklist

- EDS-205 or EDS-208 switch
- Hardware installation guide (printed)
- Warranty card

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Sixnet
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DATASHEET

RAM® 6000 Industrial Cellular RTUs
Secure Remote Monitoring & Control



PRODUCT HIGHLIGHTS

- Supports 4G LTE connectivity with fall back to 3G and 2G
- Real-time access to mission-critical data through built-in Modbus gateway
- Software Development Kit (SDK) for custom application support
- Native support for DNP3 and Modbus protocols
- Integrated security firewall provides intrusion protection
- Simplified deployment and configuration with single web-based GUI
- Support for new and legacy devices with RS232 serial or RJ45 Ethernet

APPLICATIONS

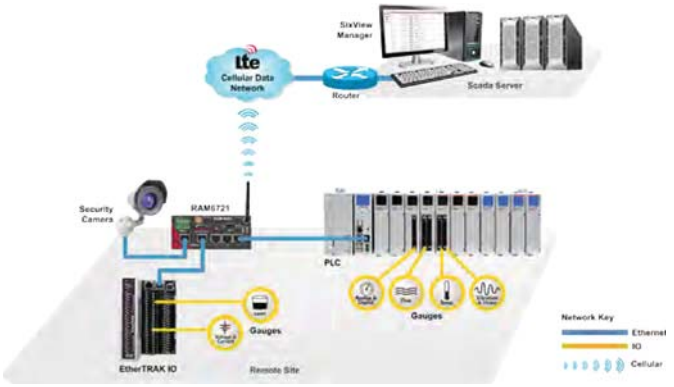
- Utilities
 - Oil & Gas
 - Water/Wastewater
- Power & Energy
 - Smart Grid
 - Solar
 - Pole-Top

CONNECT. MONITOR. CONTROL.

Sixnet RAM® 6000 industrial cellular RTUs with 4G LTE provide a flexible platform to remotely connect, monitor and control assets across industries including utilities, oil, gas, and water/wastewater. By seamlessly connecting to existing Modbus or DNP3 enabled RTUs, PLCs and other remote equipment, our industrial cellular RTUs provide instant access to data from pumps, valves, reclosers, transformer capacitor banks and meters. The I/O concentrator feature enables users to locally collect sensor data to optimize bandwidth.

Using a single web-based user interface, our cellular RTUs simplify I/O, network and security configurations to integrate complex hardware settings. This easy-to-manage configuration reduces the cost and complexity of deploying and administering multiple devices at remote locations. Furthermore, an integrated configurable stateful firewall provides intrusion protection and encrypted data access while a built-in Software Development Kit (SDK) enables users to develop custom applications. Working in conjunction with SixView Manager remote monitoring and control software, RAM RTUs provide low-cost, real-time access to outlying sites.

APPLICATION SCENARIO: REMOTE DATA COLLECTION



FEATURES & BENEFITS

Remote Monitoring & Control
- **Delivers instant access to SCADA data**
- **Provides a flexible, programmable platform**
 - Support for Modbus and DNP3 (Serial and IP) protocols
 - Simple integration for complex configurations
 - ID routing to existing Modbus hardware
 - Offers ability to develop custom applications
 - Provides intrusion protection and secure data access

Rugged, Compact Design
- **Deploys easily in space-constrained areas**
- **Requires less cabling and power supplies**
 - Operating temperature: -40° to +85°C
 - DIN rail mounted
 - Power over Ethernet (PoE) option

Ubiquitous Cellular Connectivity
- **Connects remote Modbus devices**
- **Lowers operational and equipment costs**
 - 2G/2.5G cellular
 - 3G/4G LTE cellular

Built-In Security & Routing
- **Supports security requirements**
- **Provides reliable access to I/O data**
 - Modbus data access via IPsec/SSL
 - Stateful firewall and packet filtering

Lower Cost of Ownership
- **Reduces infrastructure complexity**
- **Eliminates visits to remote sites**
 - Connect multiple devices to one WAN link
 - Remote TCP/IP based capabilities
 - RS232 serial connection or RJ45 Ethernet connections
 - Serial-to-IP conversion

RAM 6000 Industrial Cellular RTUs
Secure Remote Monitoring & Control

SPECIFICATIONS

Wireless Interface
- AT&T LTE with fall back to HSPA+ and EDGE
- Bell Mobility LTE with fall back to HSPA+
- Verizon LTE with fall back to EVDO
- Dual-band CDMA2000 EVDO Rev. A (backward compatible with 1xRTT)
- GSM HSPA (backward compatible with EDGE)
- EDGE/GPRS

Programmable Platform
- Software Development Kit (SDK)
- C/C++/Perl

Protocol Gateway
- I/O controller
- Modbus RTU/TCP/ASCII/RTU
- DNP3 - slave

Tunneling
- IPsec and SSL

IP
- NAT, port forwarding, dynamic DNS, DHCP
- Stateful inspection firewall, IP transparency

Ethernet Interface (10/100 auto-sensing)
- 1x RJ45
- 5x RJ45 (port 5 - WAN/LAN capability)

Serial Interface
- 1x RS-232 Serial DB9 115200bps

USB Interface
- 1x USB 2.0 mini

Mechanical
- RAM-6x0X dimensions: steel 120 x 96 x 32 mm (4.7" x 3.77" x 1.25")
- RAM-6x0X weight: 453g (1 lb)
- RAM-6x21 dimensions: steel 120 x 96 x 51 mm (4.7" x 3.77" x 2.0")
- RAM-6x21 weight: 500g (1.1 lbs)

Power Input
- 8-30 Vdc (12 Vdc nominal)

Environmental
- Operating temperature: -40° to +85°C
- Shock: IEC60068-2-27
- Vibration: IEC60068-2-6
- Humidity: 5 to 95% non-condensing

Certification
- CE, EMC: FCC, part 15 and Industry Canada, ICES-003
- Hazardous locations: Class I, Div. 2, Groups A, B, C, D, ISA 12.12.01
- Electrical safety: UL508/CSA22.2/14 (CUL)
- Carrier specific approvals

Inputs & Outputs
- 1x digital output
- 1x digital/analog input

Warranty
- 3 years on design and manufacturing defects

All specifications are subject to change. Contact Sixnet to learn more.

ORDER GUIDE

PART NUMBER	DESCRIPTION
RAM-6401	Cellular RTU, Modbus/DNP3 gateway with full router capability, 1 Ethernet port, 1 serial port, EDGE/GPRS
RAM-6401EB	Cellular RTU, Modbus/DNP3 gateway with full router capability, 1 Ethernet port, 1 serial port, PoE, EDGE/GPRS
RAM-6421	Cellular RTU, Modbus/DNP3 gateway with full router capability and WAN/LAN failover, 5 Ethernet ports, 1 serial port, EDGE/GPRS
RAM-660x	Cellular RTU, Modbus/DNP3 gateway with full router capability, 1 Ethernet port, 1 serial port, CDMA/EVDO Rev. A
RAM-6601EB	Cellular RTU, Modbus/DNP3 gateway with full router capability, 1 Ethernet port, 1 serial port, PoE, CDMA/EVDO Rev. A
RAM-6621	Cellular RTU, Modbus/DNP3 gateway with full router capability and WAN/LAN failover, 5 Ethernet ports, 1 serial port, CDMA/EVDO Rev. A
RAM-670x	Cellular RTU, Modbus/DNP3 gateway with full router capability, 1 Ethernet port, 1 serial port, 4G LTE/3G/2G
RAM-6701EB	Cellular RTU, Modbus/DNP3 gateway with full router capability, 1 Ethernet port, 1 serial port, PoE, 4G LTE/3G/2G
RAM-6721	Cellular RTU, Modbus/DNP3 gateway with full router capability and WAN/LAN failover, 5 Ethernet ports, 1 serial port, 4G LTE/3G/2G
RAM-680x	Cellular RTU, Modbus/DNP3 gateway with full router capability, 1 Ethernet port, 1 serial port, HSPA/EDGE/GPRS
RAM-6801EB	Cellular RTU, Modbus/DNP3 gateway with full router capability, 1 Ethernet port, 1 serial port, PoE, HSPA/EDGE/GPRS
RAM-6821	Cellular RTU, Modbus/DNP3 gateway with full router capability and WAN/LAN failover, 5 Ethernet ports, 1 serial port, HSPA/EDGE/GPRS

SIXVIEW MANAGER

Powerful Remote Device Management

With SixView Manager's enterprise-class device management features, users have access to:

Remote Administration
- Mass configuration changes and updates
- Remote executable (i.e., reboot)



Remote Monitoring & Reporting of Key Metrics
- Uptime
- Utilization
- Signal strength (RSSI)
- Firmware version, ESN, MDN, IMEI
- IP Address

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About Red Lion

As the global experts in communication, monitoring and control for industrial automation, Red Lion has been delivering innovative solutions to customers for forty years. Our award-winning technology enables companies worldwide to gain real-time data visibility that drives productivity. Product brands include Red Lion, Sixnet and N-Tron. With headquarters in York, Pennsylvania, the company has offices across the Americas, Asia-Pacific and Europe. Red Lion is a Spectris company.

For more information, visit www.redlion.net/sixnet, call +1 (518) 877-5173 or email info@redlion.net

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